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| RESEARCH ARTICLE

Versatility of the Kern Six-Step Curriculum Approach across Health Sciences Education - from Simplicity to Complexity

Mustafa M. Bodrick [1, 3, 4], Lobna A. Aljuffali [1], Mohammed Y. Alrasi [1], Areej A. Aldahash [1], Syed M. Arifi [1], Mutlaq Almutairi [2], Ibrahim M. Alhabib [1], Aws A. Obaid [1].

[1.] *Saudi Commission for Health Specialties, Saudi Arabia*
[2.] *King Fahad Medical City, Riyadh, Saudi Arabia*
[3.] *MAHSA University, Malaysia*
[4.] *Johns Hopkins University, Baltimore, USA*
Corresponding Author: Professor Mustafa Bodrick, **E-mail**: mustafabodrick@gmail.com

| ABSTRACT

The emerging complexities of the healthcare system call for structured, adaptive, as well as evidence-based curriculum frameworks. A framework that is extensively used is the Kern Six-Step Curriculum Cycle (1998). It is a seminal approach widely recognized for its systematic and learner-centered approach. This review highlights the significance of this curriculum cycle that has contributed to shaping educational programs across healthcare settings globally. A narrative literature review and analysis was conducted to explore the diverse applications of the Kern approach. This approach constituted a comprehensive, critical, as well as objective analysis of the current knowledge on the subject matter. The review synthesizes case studies, scholarly articles, and program implementations demonstrating the approach's versatility across various healthcare domains and instructional formats. Findings depict that the utilization of Kern's approach in creating curricula is critical in addressing various challenges, including skill gaps, elevating knowledge retention, as well as increasing engagement of the students. The framework has been applied effectively across the health professions, as well as in infection control training, foundational course development, anesthesiology, palliative care education, and more, as is shown. The approach supports iterative refinement and outcome-driven design in curriculum science.The Kern approach's versatility confirms its enduring relevance in healthcare education. Future research may explore its application in emerging digital and global health contexts based on its ability to be used in simple and complex situations.

| KEYWORDS

Kern Six-Step Approach, Curriculum Development, Health Sciences Education, Medical and Health Professions Curriculum

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Introductory Overview

Core and continuous education across the health professions remain central in contributing to the acquisition of the required knowledge, skills, and expertise to provide patient care and improve healthcare safety and quality. The Kern six-step curriculum approach offers essential and versatile tools to comprehensively design educational programs for healthcare professionals across different settings. The approach connotes an established and systematic cycle utilized in curriculum development, and is regarded as a seminal approach since it is extensively and consistently used, and offers a structured framework that ensures the curriculum is relevant, practical, and well-aligned to the needs and requirements of the learners and the desired outcome. This makes the approach versatile and useful across a wide range of healthcare educational contexts. This review explores research

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and literature materials to establish an understanding of the diverse applications of the approach, and the significance of acquiring and sharing knowledge and skills relevant to improving patient care and health outcomes.

Versatility of the Kern Six-Step Curriculum Approach: Simplicity to Complexity

In 1998, Kern provided an approach for curriculum development in medical education consisting of six steps (Kern et al., 1998). These six steps aim to diagnose the educational situation, identify the objectives, establish intentions, and design, implement, and evaluate the curriculum. The Kern Six-Step Curriculum Approach has the following steps (Kern et al., 2014; Chen et al., 2019):

1) Problem Identification and General Needs Assessment
2) Targeted Needs Assessment
3) Goals and Objectives
4) Educational Strategies
5) Implementation
6) Evaluation and Feedback

Each step refers to aspects designed to raise questions that can be responded to by educators responsible for planning the curriculum. The framework begins with problem identification and the conduct of a general needs assessment. This step involves identifying the problems that assist the educators to recognize gaps in knowledge or practice that must be addressed. The second step targets needs assessment and narrows the focus to the specific learners and the related contexts. This ensures that the curriculum is relevant and learner-centered. Development of goals, competencies, and objectives enables the approach to articulate what the learners should achieve. The next step involves selecting the appropriate educational strategies that would suit the objectives, including teaching methodologies, formats, and content delivery. The next requires implementation, and it includes delivery of the curriculum. Subsequently, evaluation involves assessing the effectiveness of the curriculum, including the areas that could be improved (Kern et al., 2009; Chen et al., 2019).

This seminal original of the Kern (1998) curriculum approach with specified steps has been widely applied across education, particularly in healthcare, and reflects that despite its simplicity at initial inception, it has transitioned to complex application serving the development of online module development as a conceptual framework. Chen et al. (2019) demonstrated how the Kern Six-Step Curriculum Approach could be applied effectively to the development of online medical education, ranging from small-scale instructional modules to large-scale Massive Open Online Courses. The study begins by recognizing the growing need for accessible, high-quality online education in medicine, which formed the foundation for the problem identification and needs assessment stages. Targeted objectives were then developed, tailored for a broad and diverse audience by thoroughly analyzing institutional goals as well as objectives. The educational strategies selected included a mix of self-paced learning, instructor-led components, and blended formats. Implementation focused on creating structured content that could be scaled efficiently. Therefore, consistency across different delivery platforms is ensured. The evaluation paradigms involved collecting qualitative and quantitative feedback to measure learner satisfaction, engagement, and knowledge acquisition. Chen et al. (2019) emphasized the importance of ongoing curriculum refinement and iterative development to maintain relevance in rapidly evolving online education environments. Their application of the Kern curriculum approach illustrates its versatility in the digital environment, demonstrating it to be a robust mechanism for designing structured, learner-centered online medical programs.

Gonzalo et al. (2017) used the Kern curriculum approach, combined with the Kotter change management model of eight steps (Kotter, 2009; Kotter, 2012), in respect of value-added clinical systems as they relate to medical students regarding learning roles in educational transformation and healthcare within the complex context of building partnerships between medical schools and health systems. The study was based on experiences in two U.S. medical learning institutions. Gonzalo et al. (2017) utilized the Kern approach to provide critical principles as well as strategies for meaningful and robust medical school-health system partnerships to enable learners in a value-added clinical structure learning pattern. In 2013, the learning institutions started large-scale efforts to create new, necessarily longitudinal, genuine health systems science curricula for first-year learners. In designing the novel partnership, the two models were combined; Kotter's change management and Kern's curriculum development steps. Using this combination, various strategies were recommended to elevate learning paradigms. These strategies included the realization of shared vision, identification of learning goals and objectives, empowerment of broad-based action, as well as addressing challenges in implementation and generation of short-term wins during implementation. According to the study, integrating this framework could result in value-added clinical systems learning roles, creation of a practical and robust medical school-health system partnership, as well as creation of future physicians prepared to take the lead in changing health systems. In application, it was illustrated that the Kern curriculum approach was sufficiently complex for joint use with the Kotter change model.

Illustration of the Versatility of the Kern Curriculum Approach to Applications in Healthcare

In healthcare services, the need for education to update and expand the knowledge and skills of healthcare workers has been emphasized in several studies. Nurses, in particular, need specialized knowledge and skills in health promotion, planning, implementation, and evaluation of health promotion; guidance and counselling; multi-professional and multidisciplinary cooperation and networking; and health promotion service planning and compilation of health promotion plans (Chen et al., 2019). The approach is used to design curricula relevant to connecting real-life working situations with classwork, to evaluate curriculum content and accessibility to education and resources, and to advance competence development, support workers' well-being, and promote lifelong learning. However, all the challenges should be considered equally important, enabling the awareness of models and ways to provide a good working environment as the backbone of a successful healthcare system. Education in healthcare services to update and expand the knowledge and skills of healthcare workers has been of paramount importance in healthcare service delivery (Melnyk et al., 2022). However, for an approach to be versatile in an academic setting, it has to meet specific criteria and describe the necessary content, sequencing, and teaching methods.

Implementing the Kern Six-Step Curriculum Approach falls under a structured and dynamic framework (Singh et al., 2021). This enables meaningful application across different healthcare education settings. The approach has demonstrated its capacity to respond to evolving educational needs. Its stepwise approach, from problem identification to evaluation, ensures that each curriculum is grounded in context, tailored to learners, and driven by measurable outcomes (Singh et al., 2021). Also, the approach supports traditional as well as non-traditional learning environments, including interprofessional education, community-based training, and digital platforms. This flexibility enables institutions to integrate local needs, cater to resource availability, and factor cultural dynamics into curriculum design, ensuring relevance and sustainability (Bhat et al., 2025). The approach also promotes lifelong learning. It encourages continuous feedback and curriculum refinement, which is vital in a sector where practice standards evolve rapidly. As healthcare systems demand greater workforce competence, collaboration, and patient-centered care, the Kern approach stands out as a strategic tool for aligning educational content with real-world practice, supporting both professional development and improved health outcomes (Bhat et al., 2025).

Table 1.0 *Illustration of Versatility in Using the Kern Six-Step Curriculum Approach Applied to Healthcare*

Authors	Title	Healthcare Category	Unique Benefits
Bhat, N., Dahal, A., Deo, S. K., & Bajracharya, J. (2025).	Designing and implementing foundation courses for allied health science students employing Kern's six steps: A narration of perspective	**Allied health undergraduate education**	• Demonstrates the use of Kern's approach to create foundational courses that aid students' academic, social, and professional transition into university. • The approach supports curriculum development across task mastery, acculturation, and role clarification domains, despite challenges such as limited infrastructure and student readiness. Emphasizes the value of early intervention and structured orientation to improve academic success and reduce dropout rates.
Educational IT unit (2024)	Develop a Curriculum Using the Six-Step Approach to Curriculum Development	**Faculty development**	• The article provides a comprehensive evaluation of the Six-Step approach during curriculum development. It covers the logical, systematic flexibility and engagement characteristics for the learning experience. Identifying the problem and how it can be addressed provides the foundation for the additional steps in the curriculum formulation process. • The needs assessment must consider everyone's needs to create a learning environment that assists in achieving the uniquely identified problem.
Atta, I. S., Alghamdi, A. H., & Rajab A. A. (2023).	Optimal Steps for Designing and Implementing Extracurriculars through an Integrative Medical Approach	**Healthcare education**	• Better structured extracurriculars contribute to achieving mission, vision, and program goals. • Cycle development, from planning to reporting, enhances the learning climate through a solid integrated medical program.
Heidari, H., Hossein Mirzaee Beni, Z., & Deris, F. (2023).	Using Kern approach to design, implement, and evaluate an infection control program for improving	**Nursing education & infection control**	• Applied the Kern Six-Step approach using a mixed-methods approach to develop and evaluate an infection control training program for nursing students. Showed significant

	knowledge and performance among undergraduate nursing students: A mixed-methods study		improvements in knowledge and performance through pre- and post-intervention assessments. • Emphasized the value of tailored content and continuous evaluation. Recommended curriculum revision to embed infection control modules in nursing education, including internships.
Melnyk et al. (2022)	**I.** DESIGN AND IMPLEMENTATION OF AN EMERGENCY UNDOCKING CURRICULUM FOR ROBOTIC SURGERY	**Robotic surgery**	• The researchers established baseline knowledge and emergency robotic undocking protocol for five robotic teams before two full immersion simulation experiences. • The research revealed that the participants reported elevated cognitive demands with realism and stress in the simulations mimicking real-world surgeries. The curriculum also contributed to an improved baseline in completion; checklist errors and undocking times were all identified at the end of the simulation period. However, there were insignificant outcomes from the curriculum engagement after six months.
Scala et al. (2022)	Applying Kern's Six Steps to the Development of a Community-Engaged, Just-in-Time, Interdisciplinary COVID-19 Curriculum	**Medical schools**	• The researchers focused on operationalizing a shared mission for community engagement and working through a novel solution designed for interdisciplinary practices among diverse student populations. • The curriculum is designed to ensure the consideration of healthcare needs resulting from the novel coronavirus pandemic, offering an opportunity to include community engagement, advance community health, and ensure students across the medical and non-medical education continuum increase cooperation and collaboration.
Robertson et al. (2021)	Application of Kern's 6-Step Approach in the Development of a Novel Anesthesiology Curriculum for Perioperative Code Status and Goals of Care Discussions	**Perioperative settings**	• Formal training for anthologists is required to ensure that the professionals are better equipped to make informed decisions. • The researchers identified that formal online learning platforms and the selection of journal articles that discuss objectives and goals offer needed insights to complete the curriculum outline.
Stingl et al. (2021)	Development and Implementation of a Longitudinal Global Acute Care and Systems Strengthening Program	**Acute care settings**	• The focus of the researchers was to develop a four-year curriculum with a longitudinal design for medical students across various acute care settings. • The curriculum was approved by the curriculum council in 2019, and 30 students were enrolled in the first batch of the study. Eleven interactive sessions, journal clubs, and ten seminars were used in the first year of the curriculum implementation. • 29 of the 30 students completed the curriculums, content satisfaction was set at 4.5/5 and 4.7 instructor satisfaction. The 2023 cohort revealed further improvements, including an understanding of the objectives of the session and standards of outlined activities.
Pereira et al. (2020)	Pallium Canada's Curriculum Development Model: A Framework to Support Large-Scale Courseware	**Palliative care education**	• Describes an eight-phase framework designed to support large-scale development, deployment, and ongoing updates of palliative care courses across multiple settings and

	Development and Deployment		disease groups. Enables simultaneous and staggered course production through resource-efficient, iterative processes. • Promotes scalability, reuse of course components, and tailored adaptations for language and cultural contexts. Useful for replicating broad educational rollouts across jurisdictions.
Chen et al. (2019)	From Modules to MOOCs: Application of the Six-Step Approach to Online Curriculum Development for Medical Education	**Online curriculum development**	• Special considerations are required for more extensive and diverse student audiences. The most popular curriculum formats are blended, instructor-led, self-paced, and massive open online courses (MOOCs). • Educators need to pursue more knowledge to understand and evaluate online curricula.
Robertson et al. (2019)	Application of Kern's 6-Step Approach in the Development of a Novel Anesthesiology Curriculum for Perioperative Code Status and Goals of Care Discussions	**End-of-life medical care**	• Kern 6-Step Approach assists in creating an ideal curriculum for anesthesiology in goals of care and code status discussions. • Clinical practices also consider current training paucity and the design of best practice curriculums to advance anesthesia practice.
Lindeman, B. (2017)	How to Develop an Education Curriculum for Trainees	**Academic surgery**	• Problem identification ensures that the parties involved are identified in terms of who, what, and the factors that need consideration in the initial process. • The goals and objectives of the curriculum also need to pay attention to the audience that is the target of the curriculum. • Up to two educational strategies need to be employed to implement the curriculum.
Epstein et al. (2017)	Beginning with the End-user in Mind: Application of Kern's Six-Step Approach to Design and Create a Literary Journal for Healthcare Students	**Academic journal for healthcare students**	• The researchers developed an approach that determines the engagement needs of learners and outlines engagement outcomes that meet the need; targeted outcomes are art-based to facilitate their achievement. • Implementation forums will foster feasibility and sustainability.
Gonzalo et al. (2017)	Value-Added Clinical Systems Learning Roles for Medical Students that Transform Education and Health: A Guide for Building Partnerships between Medical Schools and Health Systems	**Medical schools**	• Designing authentic workplace roles for students adds to the relevance of the education received in medical school. • Longitudinal and authentic health systems partnerships assist in developing a shared vision, identification of learning goals, and empowerment of broad-based actions to overcome implementation barriers. • The approach establishes value-added clinical systems collaborating with medical schools, which is essential for future system changes.
Faculty of Medicine, University of Toronto (2016)	Models of Course Design and Steps for Course Development	**Academic department**	• The approach centers its arguments around three questions - allowing planners to understand where they are going with education, how to get there, and how to know when. • The initial step is to consider needs assessments and the goals and objectives of the learning experience. • Furthermore, the methodology, logistical considerations, and implementation plans will define how to achieve the training goals. • The evaluation will highlight the evidence needed to establish if the program achieved its outlined objectives, including competence, satisfaction, and competence measurements.

Sweet, and Palazzi (2015)	Application of Kern's Six-Step Approach to Curriculum Development by Global Health Residents	**Patient and family education**	• Pre- and post-curricular self-assessments and knowledge acquisition skills and attitudes are central to integrating Kern's approach to develop a curriculum for patients and their family members.
Kern, D. (2014)	Curriculum Development is an Essential Educational Skill, a Public Trust, a Form of Scholarship, and an Opportunity for Organizational Change.	**Healthcare organizations**	• The author identifies the six stages: problem identification, needs assessments, setting objectives and education approaches, implementation strategies and evaluation, and feedback provision. • There is a need to identify and build a rationale on healthcare issues addressed through the learning experience.
Tsai et al. (2012)	Defiance, Compliance, or Alliance? How We Developed a Medical Professionalism Curriculum that Deliberately Connects to Cultural Context	**Medical educators**	• Developing a medical curriculum sensitive to patients' cultural needs and social expectations remains critical. • Engaging local stakeholders assists in identifying professional competencies and student and facility participation; tutor-designed objectives and goals also require the involvement of family members in the decision-making process.
Bennet, N. (n.d.)	Kern-ricular Method: A Curriculum Development Workshop for Faculty	**Faculty development**	• The Kern Six-Step approach assists in determining whether the goals of a learning experience are met. • It also offers information for improvement and assessment of individual achievements, gathering support and serving as the basis for publishing desired presentations.

Conclusion

In summary, the seminal work of the original Kern (1998) curriculum approach of six steps proves its versatility across health sciences education and includes development as a conceptual framework for online module development. The system-wide consensus across health sciences education was of the importance of lifelong learning culture, self-directed learning, and training in evidence-based practice through curriculum development through the six-step approach. In essence, as a seminal approach, the Kern curriculum approach of six steps may contribute meaningfully to standardizing diversity of curricula across the health sciences education.

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