

CHAPTER 24

Advancing and sustaining excellence in EPA-based curricula

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Abstract

The quality of health professions education is socially determined and closely linked to the quality of health care. Entrustable professional activities (EPAs) add strength to and operationalize curricula for competency-based education for health professions by focusing on both the patient and trainee, bringing health professions education together with patient care. This social accountability within an EPA-based curriculum emphasizes measurable enhancements to local health services through EPAs. As such, both external quality assurance (QA) and internal QA are crucial for implementing and improving an EPA-based program. External QA involves guidance from the regulating body regarding training policies, procedures, and practices. Internal QA entails self-auditing, utilizing mechanisms like program evaluation (PE) to monitor, evaluate, and improve the assessment and attainment of EPAs. Continuous quality improvement (CQI) can be used to augment PE by serving as a system for accountability and transparency. This section introduces the concepts of PE and CQI to be used within an EPA-based curriculum, models to support PE and CQI processes, examples of actual cases where PE and CQI were beneficial, and solutions to address challenges specific to EPA-based curricula.

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Introduction

In the development of initiatives around entrustable professional activities (EPAs), one must consider strategies for program evaluation (PE) and continuous quality improvement (CQI). These concepts are slightly different but related. PE is defined as the systematic investigation of the quality of programs,¹ with multiple potential decision-making purposes, including accountability, knowledge generation, and program development.² PE involves collecting data (both quantitative and qualitative) and providing evidence to support results to answer specific questions, such as ‘how do or will we know the “program” is working?’ and ‘is there credible evidence that the program contributed to achieving the desired results?’ PE can be narrow in scope or examine larger questions of program direction, efficiency, feasibility, and viability, and it can seek to evaluate an entire training program or focus on specific elements of the program that may be new or need revision. In CQI, the focus is on looking beyond *what* is happening to *why* it is happening and how that fits into the greater scheme of successes and failures within the initiative. It asks questions like ‘how are we doing?’ and ‘can we do better?’³ CQI should be an ongoing, constant, and sustained approach used to achieve improved standards that will lead to better outcomes, efficiency, communication, reducing errors, and improving safety.^{3,4} A CQI system adds several unique and important processes including acting upon data (from PE) to implement or improve processes, testing of program penetration/precision/consistency, testing of impact, and cost analysis or considerations. CQI provides a system of accountability and transparency to both internal and external stakeholders (e.g., consumers, partners, and regulating bodies). PE is fundamental to CQI, serving as part of the planning, feedback, and evidence used for decision-making. The capacity to do PE is a characteristic of a high-functioning CQI program. Therefore, developing CQI processes that incorporate solid strategies for PE will help ensure a continued driver for analysis and improvement of initiatives around EPAs.

Building on this foundation, the literature underscores the significance of establishing PE and CQI processes at the outset of initiatives to enhance educational outcomes.⁵⁻⁸ These processes are crucial for effectively addressing challenges, such as the risk of implementing improvements only after problems have occurred, which can miss opportunities for immediate enhancement. They help maintain momentum and trust by clearly defining roles, setting up efficient data collection systems for quick problem identification and resolution, and reducing duplication of efforts by integrating these processes into existing assessment frameworks. Furthermore, it is important to establish mechanisms to keep all stakeholders well-informed about progress and procedures, ensuring ongoing community engagement and support for the initiatives.

By being very intentional about setting up PE and CQI processes at the beginning, an institution can engage in PE and CQI in a meaningful way that will ensure the desired impact and avoid unintended negative consequences. It is rare that initial implementations of educational innovations and programs ‘get it right’ from the start. Making conscientious efforts to set up mechanisms to identify potential issues as they occur leads to better outcomes. In fact, in the implementation of Competence-By-Design in Canada, introduced in 2017, the Royal College of Physicians and Surgeons of Canada’s PE strategy was able to detect and respond to a host of unintended consequences of initial implementation, including negative impacts on resident wellness.⁹ Other examples include the identification of curricular deficiencies that need to be addressed to ensure success in EPA assessments, such as the experience of the West Virginia School of Osteopathic Medicine, where a lack of opportunities for learners to perform oral presentations during clinical training—despite the requirement to be assessed on this essential EPA—led to curricular revisions to better ensure opportunities for direct assessment in clinical training.

Models of program evaluation and continuous quality improvement

Evidence-based CQI should be an ongoing cycle of collecting data and then testing, implementing, learning from, and revising solutions. Several models can be used for both CQI and PE. The PDSA cycle, devised by Deming, is a methodical four-step approach (plan–do–study–act) for continuous improvement by systematically integrating learning and knowledge acquisition through innovation or implementation.¹⁰ The cycle starts with planning a goal and strategy, followed by implementing the plan, studying the outcomes to evaluate success or identify improvements, and finally acting on these insights to refine or expand the approach, thus initiating a new cycle of improvement. Most CQI models have roots in Deming’s PDSA model.¹⁰ For example, the CAPA-CAR model¹¹ (context–aim–plan–approval—collect–analyze–report) builds on Deming’s PDSA model by expanding phases for considerations unique to curriculum and faculty, such as the context and approval phases. Other popular models place PDSA within a specific context to provide direction to the process. These include Lean,^{12,13} which focuses on organizational improvement in the context of the patient and identifying poor quality and waste, and Six Sigma,¹⁴ which emphasizes DMAIC (define–measure–analyze–improve–control), with a focus on reducing variations and defects. Depending on an institution’s goals and findings from PE, one or more of these models may be useful in outlining an institution’s CQI initiatives. Within CQI initiatives, specific steps can be supplemented by the logic models, PE models, and other evaluation methods noted in Table 24.1.

These models or frameworks can be explored to supplement phases of an institution’s CQI initiative depending on the questions outlined for focus and review. The frameworks can support multiple types of evaluation and feed into an institution’s CQI process. Types of PE include formative, developmental, process, outcome, economic, and impact evaluation.

Table 24.1: Example models or frameworks to support program evaluation and continuous quality improvement.

Frameworks or models	Explanation
Logic model ^{21,22}	A logic model is a tool commonly used in PE to build an understanding of how a program is supposed to work, that is, the relationship between the program components or process and the program outcomes. It links results and changes with inputs, activities, outputs, and outcomes.
Kirkpatrick framework ²³	It is used to evaluate the results of training and learning programs through four criteria: reaction, learning, behavior, and results. Recent discussions have proposed new thoughts on this framework related to EPA assessments in relation to patient outcomes. ²⁴
Rapid evaluation ^{25,26}	PE focused on capturing and providing timely evidence to engage in a process of evolutionary adaptation. Key steps: (a) description of the ideal implementation, or implementation as intended (b) measurement of stakeholder experiences, or implementation as enacted (c) proposed program adaptations based on an analysis of the ideal vs enacted implementation.
Realist evaluation ^{27,28}	Realist evaluation asks the questions: what works, for whom, in what circumstances, in what respects, to what extent, and why? It employs multiple methods of data collection and analysis, seeking to ensure an in-depth understanding of both the context of implementation and subsequent outcomes, considering the mechanisms by which the desired outcomes of an educational intervention are or are not experienced.
Experimental or quasi-experimental models ²⁹	These are used to determine cause and effect and support multiple designs such as intact-group design, time-series experimental design, and ex post facto experiment design. ²
CIPP-I model ³⁰	This model expands the CIPP model ³¹ to include analysis of context, input, process, product, and impact.

Formative evaluation involves gathering evidence during implementation to understand strengths and weaknesses for improvement purposes, to ensure that a program or program activity is feasible, appropriate, and acceptable before it is fully implemented. It is a feasibility study that is usually conducted when a new program or activity is being developed or when an existing one is being adapted or modified.¹⁵

Developmental evaluation supports innovation development to guide adaptation to emergent and dynamic realities in complex environments. It is particularly suited for innovation, radical program redesign, replication, complex issues, and crises.¹⁶

Process evaluation determines whether an educational intervention or program has been implemented as intended, also known as the fidelity of implementations.¹⁷

Outcome evaluation measures program or intervention effects in the target population by assessing the progress in the outcomes or outcome objectives that the program is to achieve.¹⁸

Economic evaluation looks at the cost–benefit of the program, which could include cost analysis, cost–effectiveness evaluation, cost–benefit analysis, cost–utility analysis, value-based analysis, etc.¹⁹

Impact evaluation assesses program effectiveness in achieving its ultimate goals.²⁰

How does this apply to EPAs initiatives? First, these models can be used to develop processes for continuous improvement in EPAs-based curriculum. One example is for the clinical competency committees (or equivalent body performing summative assessments) to support quality improvement efforts by recording comments in quality, scope, and practice that may need to be adjusted or changed in the curriculum, in the professional development of evaluators, in opportunities for assessments, in the expansion of views or evaluators with multiple views to broaden perspectives, etc. By presenting findings to end users (i.e., clinical competency committees, assessors, and learners/trainees), institutions can better understand variances, uncover possible factors causing issues, and discover viable solutions for improvement. Boxes 24.1, 24.2, and 24.3 provide example cases of CQI in EPA implementation initiatives in different countries.

Box 24.1: Rapid evaluation cycle at Queens University, Kingston, Ontario.

With the staged implementation of CBME and EPAs in the specialist Canadian Postgraduate Medical Education system by the Royal College of Physicians and Surgeons of Canada (starting in 2017),³² it was imperative to understand the experience of early implementers and those who piloted EPAs prior to formal implementation. One such program was the emergency medicine training program at Queen's University in Kingston, Canada. Recognizing the need to engage in evaluation and for prompt broad sharing of lessons learned, program leadership coordinated with national education leaders to engage in a systematic rapid evaluation of program-level implementation post-implementation with a focus on both fidelity of implementation and the measurement of early outcomes.²⁶ After an explicit description of the ideal implementation, stakeholder focus groups and interviews were performed at three and nine months after implementation. Organized using the core components framework,³³ thematic analysis was conducted to understand stakeholder experiences, and the actual, or enacted, implementation was compared with ideal implementation to plan rapid adaptations. An example of an early lesson learned was clear concerns about the granularity of assessment with EPAs and a loss of the 'forest for the trees,' prompting the return of global feedback to supplement EPA-focused feedback. Additionally, there was detection of a lack of a shared mental model in the use of assessment tools and scales, resulting in significant variability and difficulty among frontline faculty assessors. The findings of this PE were shared broadly with the Canadian medical education community to help revise subsequent CBME/EPAs implementations. Further, this method of rapid evaluation has been further employed to evaluate the implementation of CBME by the Royal College of Physicians and Surgeons of Canada across multiple disciplines and institutions.⁶

Box 24.2: Implementing the continuous quality improvement cycle in CBME: the Taiwan experience.

To advance health care training programs toward EPA- and competency-based approaches, leaders from various institutions and specialties in Taiwan adopted the logic model. Since 2016, they have collaboratively investigated problems, created consensus, and designed tools and strategies for implementing a CQI cycle.

World Café workshops emerged as an appropriate tool to address initial challenges, which revealed the failure of the ‘top-down’ model in previous educational reforms. This innovative strategy facilitated connections among diverse perspectives, promoted the development of shared mental models, and served as a valuable platform for faculty development. As a result of this collaborative effort, Taiwan now boasts nationwide versions of EPAs for various postgraduate programs, including anesthesiology (2017), post-graduate general physicians (2018), emergency medicine (2019), otolaryngology-head and neck surgery (2021), and also undergraduate medical education (2024).

Furthermore, specialized evaluation toolkits were devised to address a second issue concerning the quality of implementation. A Competence Committee Checklist (2019), a Program Evaluation Committee Checklist (2021), and a Program Evaluation Checklist (2023) were introduced to bolster the effectiveness and integrity of the program’s design and execution.

To alleviate the administrative load associated with organizing the competence committee and program evaluation committee, and to effectively implement the CQI cycle, some institutions have adopted Microsoft Power BI, using the vast educational data available from the clinical training e-portfolio platform as indicators for program quality. Data analysis with Power BI enabled a comprehensive and continuous review of various aspects such as the quantity and quality of courses delivered, faculty development, trainee performance, and feedback on areas like workplace-based assessments with EPAs.

Box 24.3: Continuous quality improvement under low resourced conditions: an Argentina experience.

CQI requires resources that are not always available. The undergraduate medical program of the Universidad Nacional de Cuyo, in Mendoza, Argentina, applies a quality assurance process with limited resources. The program has been externally evaluated four times in the last 20 years and was accredited every time. However, institutional concerns arose regarding the assessment system and the expected learning outcomes in the final mandatory practice (FMP) year of the program. Limited resources precluded them from having a dedicated team or person for CQI, and no technology was available for automated data collection and processing. Any annual CQI thus belongs to the work of already-busy teaching coordinators.

Within these limitations, the defined CQI goals remained to improve the specification of competencies and to develop an assessment system that is accepted by teachers and students, to warrant sustainability across time. Coordinators of the four main clerkships

(Continued)

played a key role in this CQI implementation under the decisive leadership of the director of FMP, and supported by education specialists and faculty development. Since 2017, five internal annual cycles of quality assessment (with a two-year COVID-19 pause) have focused on purpose definition, planning, change implementation, data collection, analysis, and purpose reformulation for the next academic year. Evaluation data included student assessment results, supervisor opinions through online surveys and face-to-face workshops, and student opinions collected by surveys.

In each cycle, steps toward the CQI goals were taken, based on the evaluation of the previous academic year. This model allowed those who provided evaluation input to witness change and feel ownership.

Informed by this formative evaluation and in the context of a new external evaluation, a new curriculum design was planned for 2025, with EPAs and assessment based on entrustment decision-making.

Table 24.2: Challenges of program evaluation and continuous quality improvement specific to EPA-based curricula.

Key factors	Challenges to be addressed
Money/resources	Establishing reasonable budgets (including all possible costs such as technology platforms, data analysts, funds to support focus groups, and so on) will ensure a projected amount of money to complete/support the initiative.
Dedicated person	A dedicated person or team (depending on size of programs) will help establish responsibility and ensure a point person with the skills and experiences necessary to carry out the initiatives.
Timeframe	A realistic timeline will help establish accountability for the PE and CQI initiatives.
Projects not sustainable	Consider breaking the initiative into smaller projects or phases, as needed. By breaking initiatives into smaller projects, an institution can build enthusiasm and energy from project to project while still pulling findings together from each project into an overall initiative.
Stakeholder buy-in	Buy-in is imperative. Ensure that stakeholders are included in the processes so that they are not resistant to the initiatives—providing professional development can help with buy-in.
PE and CQI alignment	Ensure that continuous quality improvement feeds into an institution’s program planning so the institution can see and highlight the findings to action.
Leadership and culture	Institutions should ensure support and expertise in methods at the very top levels so that the culture is affected at all levels of the organization, not just the ground levels.
Data capture and visualization	Institutions can lessen the administrative load associated with organizing data for use by stakeholders (i.e., clinical competency committees), program evaluation committees, and for CQI processes by employing effective data capture and visualization systems.
Clear goals and objectives	Institutions should engage stakeholders to ensure cocreation of the programs(s) and processes related to EPAs for not only clarity of goals and objectives but also for buy-in.

Several challenges may come to light in thinking of PE and CQI specific to EPA-based curricula, especially in the area of time and resources to carry out initiatives. Table 24.2 introduces challenges that institutions should consider.

Conclusion

While defining quality can be subjective and ever-changing, as well as influenced by a multitude of factors both internally and externally, it is also imperative as a driver for improvement and mechanism to ensure success by identifying and overcoming challenges faced. Institutions must be thoughtful in creating the CQI (and PE) initiatives, remembering that a combination of tools, methods, and processes can be used and focusing on an organization's specific needs and goals. These CQI initiatives should be fully embraced as part of continued growth and development for both the curriculum or assessment program as well as faculty serving as teachers or evaluators in the system.

Competing interests

The authors declare that they have no competing interests.

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