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Making Practical Teaching Reasoning Explicit Through Theory-Informed Enactment

SHOW AND TELL

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ABSTRACT

Background & Need for Innovation: Teaching in clinical medicine is often treated as a byproduct of clinical expertise rather than a theory-informed practice requiring deliberate preparation. Faculty development (FD) emphasizes what clinician-educators should know about learning but is less explicit about how theory can inform instructional decision-making in authentic contexts.

Goal of Innovation: We designed a one-year FD program to help clinician-educators articulate practical teaching reasoning, examine that reasoning using relevant educational knowledge, and translate the analysis into deliberate teaching decisions. Epistemic agency—the capacity to evaluate, adapt, and use knowledge for purposeful action—underpinned this goal.

Steps Taken for Development and Implementation: We organized a 17-session curriculum around Process-Oriented Guided Inquiry Learning (POGIL). The virtual design combined asynchronous reflection with synchronous facilitated inquiry. Participants examined authentic teaching experiences and practice-based reasoning, brought that reasoning into dialogue with relevant theories, frameworks, models, or tools, and developed adaptable teaching responses.

Evaluation of Innovation: Across 3 cohorts, 68 participants had approximately 70% live synchronous attendance. Among 68 invited alumni to an anonymous survey, 29 responded (43%). Respondents described greater awareness of their teaching reasoning, use of educational concepts as interpretive resources, and application of program learning in teaching, curriculum, and scholarship.

Critical Reflection on Process: Three implementation tensions refined the design: balancing cognitive efficiency with conceptual depth, accounting for institutional conditions and resources, and ensuring transparency across asynchronous and synchronous learning. Findings are retrospective self-report and do not directly establish sustained behavioral change, epistemic agency, or causal program effectiveness in this evaluation alone.

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BACKGROUND & NEED FOR INNOVATION

Teaching in healthcare is often assumed to arise naturally from clinical expertise rather than from a theory-informed scholarly practice requiring deliberate preparation and structured development. Clinical education is increasingly challenged by rising learner demand, workforce shortages, and competing service and productivity pressures [1]. Beyond clinical supervision, educators are expected to function as diagnostic assessors, content curators, professional coaches, and adopters of educational technologies [2, 3]. These increasing demands on faculty often occur without corresponding preparation for enacting them effectively [4, 5].

Faculty development (FD) has emerged in response to these pressures but remains variably defined and practiced [6]. Typical formats, such as expert-led workshops, curated readings, and case-based discussions, may present educational theory as abstract knowledge rather than as a practical resource for instructional decision-making [4, 6, 7]. Although participants frequently report increased awareness and collegial connection, they may struggle to translate theoretical insights into teaching practices feasible within clinical work [5–8]. Consequently, teaching expertise often continues to develop through informal, on-the-job learning, limiting transferability across contexts [7, 9, 10].

Educators need support in developing epistemic agency: the capacity to evaluate, adapt, and use knowledge as a functional resource for instructional decision-making and action [11–13]. For clinician-educators, this means judging the relevance of educational concepts, adapting them to context, and using them to inform authentic teaching decisions. Simultaneously, approaches must be feasible within clinical work, where teaching competes with patient care and other institutional priorities [7, 9]. These dual challenges—bridging theory and practice while ensuring feasibility and relevance—define a critical design gap in faculty development.

Educators also need approaches that render the application of educational theory explicit, structured, and feasible in real-world clinical contexts. We implemented this innovation within Faculty College, a one-year FD program for faculty from multiple health professions across Texas Children's Hospital campuses. The program previously consisted primarily of standalone, expert-led sessions without a consistent instructional architecture. To address this gap, we adopted Process-Oriented Guided Inquiry Learning (POGIL), a structured, inquiry-based pedagogy organized as a cycle of exploration, concept formulation, and application [14, 15]. Faculty examine their existing teaching practices and reasoning, use relevant educational theories to reinterpret those practices, and co-construct strategies and artifacts for use in their own settings. This structure makes connections among experience, theory, and instructional action explicit, deliberate, and repeatable.

GOAL OF INNOVATION

Our goal was to design a one-year FD program that helped clinician-educators identify their practical teaching reasoning, examine it using relevant educational theories, and translate that analysis into intentional teaching decisions, strategies, and artifacts in authentic settings. Epistemic agency underpinned this goal: participants were expected to evaluate, adapt, and use educational knowledge rather than simply acquire it. The program also was designed to ensure that this engagement was manageable and relevant within clinical work (Figure 1).

STEPS TAKEN FOR DEVELOPMENT AND IMPLEMENTATION

CURRICULAR STRUCTURE

Stakeholder analysis and an environmental scan of FD literature identified contemporary educator roles that informed the selection and organization of session topics [2]. To support these roles, we curated a focused set of educational theories and evidence-informed practices, drawing from existing literature and our collective experience as education scholars. Rather than aiming for comprehensive coverage, we prioritized high-yield, transferable concepts that could inform real-time teaching decisions. The program enrolled faculty across health professions; groups were not intentionally composed by profession, and participants brought varied clinical and teaching experiences to discussions.

The resulting curriculum is summarized in Supplementary Table 1 by educator role, session topic, application task, and associated theory/framework/tool anchors. All participants were offered the same 17-session curriculum distributed throughout one academic year. Sessions were held approximately twice monthly and included two hours of synchronous virtual instruction, with approximately 40 minutes of asynchronous preparation before each session (Supplementary Table 2). Standard program completion required credit for at least 15 of 17 masterclasses (88%), earned through live participation or review of recordings for missed sessions; not every participant attended every session live. Small groups typically included 6–7 participants. The core topics, curricular sequence, and POGIL architecture remained stable across cohorts. Iterative

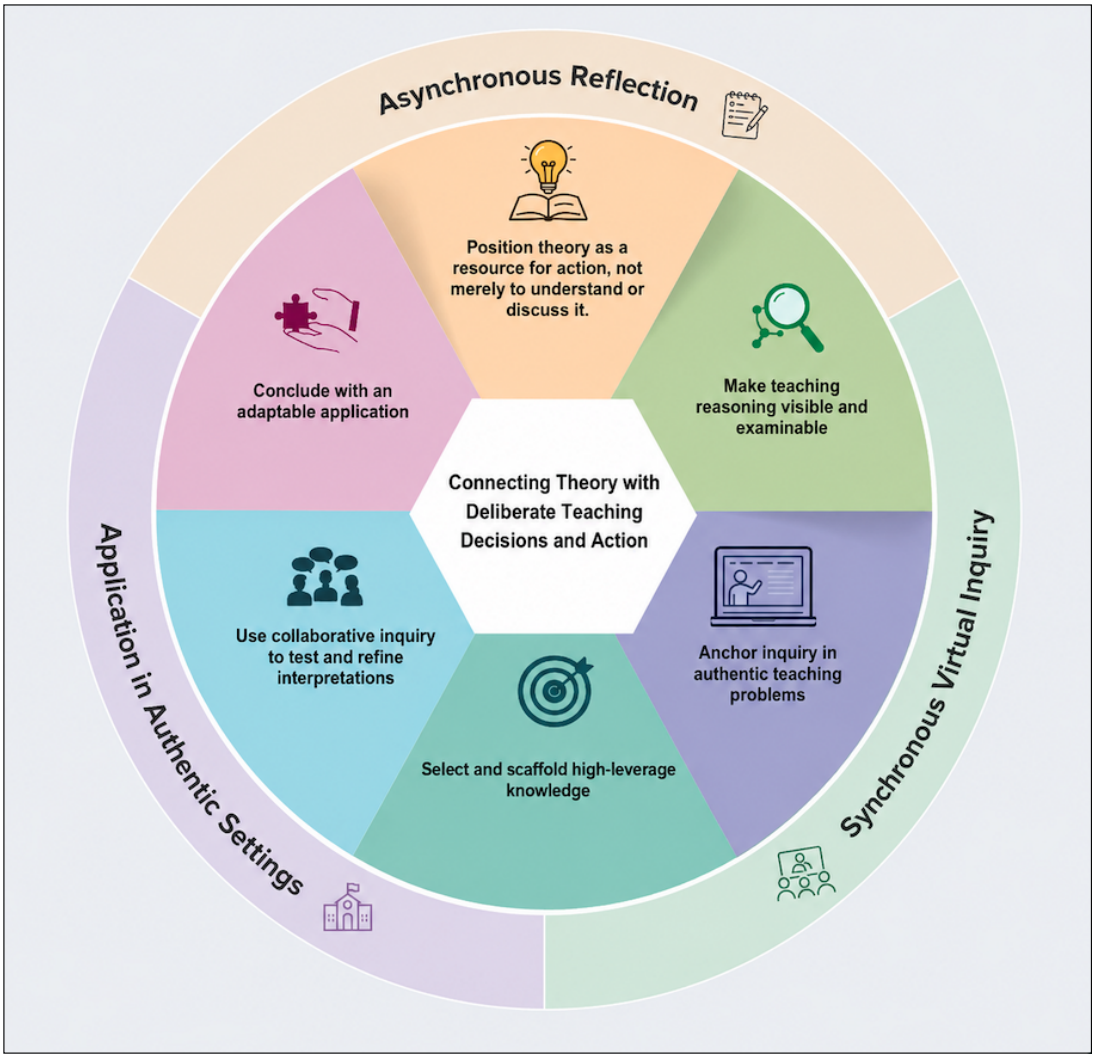


Figure 1 Design principles for making theory practical in faculty development. Six guiding principles informed Faculty College and were enacted through a virtual structure integrating asynchronous reflection, synchronous guided inquiry, and application in authentic teaching contexts. In this figure, "theory" refers to formal educational theories and related frameworks, models, and evidence-informed tools used to inform teaching decisions. The principles were: (1) position theory as a resource for action; (2) make teaching reasoning explicit and examinable; (3) anchor inquiry in authentic teaching problems; (4) select and scaffold high-leverage knowledge; (5) use collaborative inquiry to test and refine interpretations; and (6) conclude with an adaptable application.

refinements focused primarily on broader recruitment of advanced practice providers and faculty from other health professions and adaptation of digital supports.

INSTRUCTIONAL DESIGN

Guided by our design principles, we identified POGIL as a fit-for-purpose instructional approach [14]. POGIL is a learner-centered pedagogy grounded in social constructivism, with a learning cycle of exploration, concept formulation, and application [15]. POGIL has been shown to support mastery of content and higher-order process skills through structured collaborative inquiry [16]. Its inquiry cycle mirrors the use of theory our program sought to support. Participants begin with an authentic teaching experience or problem, examine that experience using relevant theories, frameworks, evidence-informed practices, or tools, and then create or adapt a strategy, product, or decision for practice. This sequence allows participants' existing reasoning to be examined while positioning formal educational knowledge as a resource for action.

Our cycle used a virtual format integrating asynchronous preparation with synchronous facilitated sessions (Figure 2). Faculty examined their existing teaching practices and tacit reasoning during Exploration, used theories to examine and refine that reasoning during Concept Formulation, and co-constructed instructional strategies or artifacts for local use during Application. In all sessions, theory functioned as a tool for reasoning and teaching decision-making rather than content to be mastered. A central design feature was the distinction between *personal theories*—experience-

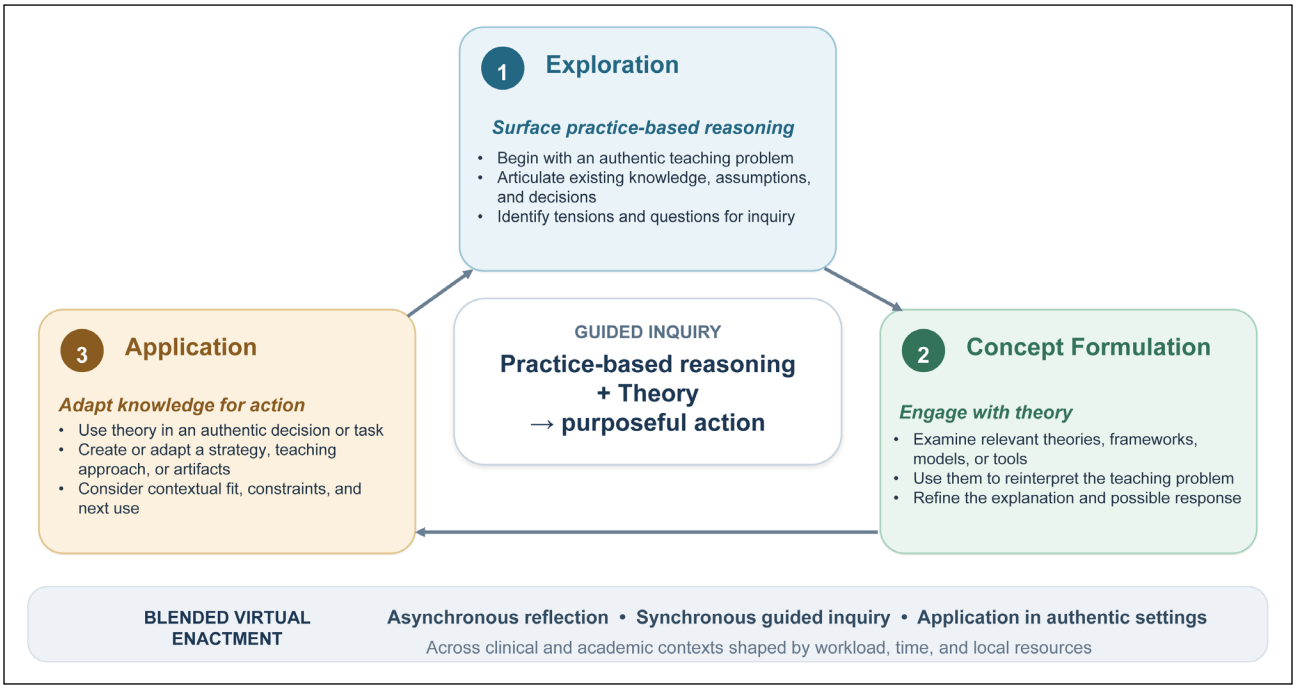


Figure 2 The POGIL cycle operationalized in Faculty College. The adapted three-phase inquiry cycle used across Faculty College sessions. Exploration surfaces participants' practice-based reasoning by eliciting existing knowledge, assumptions, and decisions around authentic teaching problems. Concept Formulation engages participants with relevant theories, frameworks, models, or tools to reinterpret the problem and refine possible responses. Application supports purposeful action by using and adapting this knowledge to inform authentic teaching decisions and develop strategies, approaches, or artifacts. The cycle is enacted through asynchronous reflection, synchronous guided inquiry, and application in authentic settings across clinical and academic contexts shaped by workload, time, and local resources. POGIL, Process-Oriented Guided Inquiry Learning.

or practice-based understandings and assumptions that guide everyday teaching actions—and *formal theories* drawn from scholarly literature [17]. Relevant frameworks, models, evidence-informed practices, and tools also served as resources for examining and refining practice.

We treated participants' experiential and tacit knowledge as a legitimate starting point and brought it into dialogue with formal educational knowledge to support more deliberate, contextually responsive action.

EXPLORATION

Participants first engaged asynchronously with curated materials that highlighted common teaching challenges and tensions rather than formal theory. These materials were paired with brief video reflections in which participants interpreted their own teaching experiences. Synchronous sessions began with review of selected reflections followed by discussion. In the Coaching Clinical Reasoning masterclass, groups examined an attending-resident role play and explored how the presentation and clinical setting shaped diagnostic reasoning. This phase surfaced participants' existing assumptions and experiences, articulated their personal theories, and established a shared problem space for inquiry [10].

CONCEPT FORMULATION

Formal educational theories and related conceptual resources were introduced through brief interactive segments responsive to tensions raised during Exploration. Participants analyzed teaching challenges using these resources and guided critical thinking questions. In the clinical reasoning example, the Assessment of Reasoning Tool (ART) was introduced to structure informative, non-summative feedback [18]. Participants examined domains such as hypothesis generation and evidence interpretation in relation to the teaching problem identified during Exploration. This phase supported a shared conceptual vocabulary and positioned formal educational knowledge as a response to practice-based needs rather than isolated content [19].

APPLICATION

The cycle culminated in collaborative application to an authentic teaching challenge. Participants developed tangible outputs such as teaching-module designs and coaching scripts. In the clinical reasoning example, participants used the ART to analyze a recorded resident presentation, identify strengths and gaps in reasoning, and formulate structured feedback and coaching language

[20] (Supplementary Table 3). Requiring usable products positioned theory as a practical resource for action and made theory-informed instructional decision-making explicit [3, 21].

VIRTUAL LEARNING ENVIRONMENT

The program was delivered within a blended virtual learning environment that integrated numerous technologies to support asynchronous reflection, synchronous inquiry, and ongoing collaboration. Participants used Flip (Microsoft Corp, Redmond, WA; available from: https://flip.com) and Padlet (Padlet, San Francisco, CA; available from: https://padlet.com) to post preparatory reflections and respond to peers; they used Zoom (Zoom Video Communications, Inc, San Jose, CA; available from: https://zoom.us) for synchronous small-group inquiry, and Miro (Miro, San Francisco, CA, and Amsterdam, the Netherlands; available from: https://miro.com) as a collaborative whiteboard supporting real-time co-construction of ideas, visual mapping, and development of shared artifacts.

These activities were designed as an integrated learning experience rather than as a discrete event. A centralized digital platform, Asterisphere (Flourishing Nexus, LLC, Houston, TX; available from: https://flourishingnexus.com), was used to organize session materials, participants' contributions, and evolving outputs, providing continuity across asynchronous and synchronous components. Rather than functioning as a neutral technological infrastructure, the environment operationalized continuity of inquiry as a design principle, structuring how participants engaged with, revisited, and iteratively applied content and knowledge across time, clinical contexts, and collaborative interactions. The platforms, however, were delivery supports rather than essential components of the underlying POGIL design and could be replaced by locally available equivalents.

EVALUATION OF INNOVATION

PARTICIPANT DEMOGRAPHICS AND IMPLEMENTATION FEASIBILITY

The program engaged 68 clinician-educators, including faculty from medicine, nursing, psychology, osteopathic medicine, clinical genetic counseling, and respiratory therapy, across three cohort years. Live synchronous attendance was approximately 70%. This figure describes live attendance only; the standard completion requirement (at least 15 of 17 masterclasses, 88%) could be met through live participation or recording review (Supplementary Table 2). Participation did not routinely include protected time.

EVALUATION DATA

We evaluated program reach and participation, perceived relevance, and alumni-reported application of program learning. An anonymous alumni survey was administered in July–August 2024 to 68 graduates from the 2021–2022 through 2023–2024 cohorts; 29 responded (43%). Epistemic agency informed the conceptual framing of the innovation but was not prespecified or directly measured as an evaluation outcome. The survey included 14 items asking whether participants had used lessons from individual Faculty College sessions since graduation and one open-ended question asking about the program's impact on teaching or professional development. Overall live synchronous attendance was calculated as the number of participant-session opportunities meeting the attendance criterion (participation in at least 75% of a session's duration) divided by the total number of scheduled participant-session opportunities. Recording review was excluded from this measure. Individualized exceptions affected completion decisions only and were not counted as live attendance. Data were analyzed descriptively to assess reach and feasibility.

Narrative responses were first reviewed descriptively and coded to summarize recurrent ideas. During team meetings, these codes and supporting responses were interpreted in relation to the POGIL phases, which served as a deductive organizing framework. Three program faculty (AB, JB, and KH), all involved in Faculty College design and delivery, participated in this review.

Responding participants reported that the lessons learned were relevant and usable. Across the three cohorts, 178 post-session evaluations indicated high ratings for facilitator teaching effectiveness (mean = 4.7), achievement of session objectives (mean = 4.5), and perceived effectiveness of learning activities (mean = 4.5), all measured on a 5-point scale. These evaluations informed session improvement. They were not designed to compare masterclasses, evaluate individual POGIL phases, or establish educational effectiveness.

MOVEMENT TOWARD THEORY-INFORMED ENACTMENT

In retrospective self-reports, recurrent ideas were interpreted in relation to the POGIL cycle: participants described articulating existing reasoning, engaging with educational concepts, and applying those concepts in practice. Because POGIL also informed the interpretive analysis, this alignment should be understood as a theoretically organized reading of participants' accounts rather than as independent evidence that each phase produced a distinct outcome.

In relation to Exploration, participants described increased awareness of their teaching practices and underlying assumptions and greater intentionality in recognizing teaching opportunities.

In relation to Concept Formulation, alumni described using formal theories to reframe and structure their understanding of teaching challenges. They articulated how concepts such as growth mindset, cognitive load, debriefing approaches, competency-based assessment, and PICRAT helped them interpret learner behavior, diagnose instructional problems, and organize decision-making.

In relation to Application, participants described translating these structured interpretations into teaching products and practices within their own contexts, including interactive case-based sessions, restructuring feedback approaches, and curricular adaptations. These accounts provide self-reported examples of theory-informed enactment within participants' teaching contexts.

ADAPTABILITY ACROSS ROLES AND CONTEXTS

Participants reported applying concepts beyond individual sessions, including curriculum development, committee work, and educational scholarship. One participant reported using Faculty College knowledge "*almost weekly*" to support work on a medical school curriculum committee, while another applied concepts to write and study a resident-as-teachers module and used Passive, Interactive, Creative, Replaces, Amplifies, Transforms (PICRAT) as a conceptual model for subsequent scholarship. Participants also cited the program as "*essential/helpful*" in supporting later educational leadership roles and scholarly products.

These findings should be interpreted cautiously as retrospective, self-reported signals of transfer rather than evidence of demonstrated behavioral change or causal effectiveness. Nonetheless, they suggest that the program supported movement from implicit, experience-based reasoning toward more deliberate, theory-informed teaching practices.

CRITICAL REFLECTION ON PROCESS

Three tensions emerged, clarifying priorities for future iterations.

First, we navigated the tension between cognitive efficiency and conceptual depth under clinical constraints. Alumni described efforts to apply concepts, although opportunities for enactment varied with teaching roles, time constraints, and immediate needs. Some noted limited avenues to implement specific concepts in their current roles. Requests for concise, retrievable resources highlighted the need to support re-access and reuse of key concepts over time. Future iterations will pair core conceptual content with concise retrieval tools that support ongoing application without reducing conceptual depth.

Second, implementation depended on institutional conditions that should not be obscured by the program's virtual and cognitively efficient design. Protected time was not routinely available, and participation occurred alongside faculty members' existing responsibilities. Program delivery also required facilitator preparation and teaching time, administrative coordination, and access to digital platforms. The format was intended to reduce avoidable participation burdens, not to substitute for protected time, workload recognition, or appropriate institutional support. Supplementary Table 2 provides approximate implementation requirements. What is most transferable is the POGIL cycle and its connection of authentic experience, educational knowledge, and purposeful action; the yearlong schedule, technology infrastructure, and staffing model represent one local enactment that may require adaptation to institutional resources and participant needs.

Third, we encountered a tension related to process transparency across the virtual environment. Our implementation experience suggested that each component should serve a distinct instructional purpose: asynchronous spaces surfaced personal theories, synchronous sessions supported shared sense-making, and collaborative tools made reasoning and artifact construction explicit. Technology should remain subordinate to learning goals; its value lay in enabling intentional instructional decisions rather than tool adoption alone. Technology usability and cognitive burden were not evaluated separately. Future iterations will make these transitions and purposes more explicit at the beginning and end of each session.

The program enrolled participants from various health professions but did not intentionally structure or evaluate interprofessional learning. Groups were not composed by profession, activities did not specifically require cross-professional comparison, and the evaluation did not examine profession-specific experiences. Interprofessional composition should therefore be understood as a characteristic of the cohorts rather than as an established mechanism or outcome of the program. Future iterations could intentionally compose groups, incorporate cross-professional prompts, and evaluate how professional diversity influences participation and learning. Our evaluation has important limitations: findings are based on retrospective self-report from 43% of alumni, without longitudinal follow-up, direct observation of changes in teaching practices, or assessment of learner outcomes.

These retrospective accounts indicate that respondents perceived the program as relevant and reported using program learning in teaching, curriculum, and scholarship contexts. The findings do not establish sustained behavioral change, epistemic agency, or causal program effectiveness.

Rather, they provide preliminary evidence that participants could engage with and describe applications of a POGIL-based approach that connected practical teaching reasoning with formal educational knowledge.

DECLARATION OF ARTIFICIAL INTELLIGENCE USE

ChatGPT (OpenAI; GPT-5.6) was used to assist with language refinement, and critical examination of the clarity and consistency of author-developed concepts and arguments. All final wording was determined and verified by the authors. The authors confirmed the originality and accuracy of the content, and take full responsibility for the integrity of the manuscript.

DATA ACCESSIBILITY STATEMENT

The qualitative dataset is withheld to protect participant anonymity.

ADDITIONAL FILES

The additional files for this article can be found as follows:

- **Supplementary Table 1.** Faculty College curriculum architecture: educator roles, theory, and applications. This table maps the one-year curriculum by educator role, showing each session topic, its application task, and the educational theory, framework, model, or tool that supports instructional reasoning and action. DOI: https://doi.org/10.5334/pme.2865.s1
- **Supplementary Table 2.** Faculty College program structure and blended delivery across the academic year. This table summarizes the recurring structure of the one-year program, including cadence, participant activities, facilitator roles, POGIL function, expected outputs, and program supports across asynchronous and synchronous virtual components. DOI: https://doi.org/10.5334/pme.2865.s2
- **Supplementary Table 3.** Worked example of the POGIL cycle in the Coaching Clinical Reasoning masterclass. This table illustrates how participants' practice-based reasoning was surfaced during Exploration, examined using the Assessment of Reasoning Tool during Concept Formulation, and translated into a structured feedback response during Application. POGIL, Process-Oriented Guided Inquiry Learning. DOI: https://doi.org/10.5334/pme.2865.s3

ETHICS AND CONSENT

This program evaluation was approved by the Baylor College of Medicine Institutional Review Board (protocol H-50598). Faculty College alumni were invited to complete an anonymous survey, and participation was voluntary. No identifying information was collected, and participant quotations are reported without attribution.

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COMPETING INTERESTS

Satid Thammasitboon is Deputy Editor of *Perspectives on Medical Education*. The author had no involvement in the editorial handling, peer review, or decision-making for this manuscript, which were managed independently by the Editor-in-Chief and an Associate Editor.

AUTHOR CONTRIBUTIONS

Audrea M. Burns contributed to data acquisition, formal analysis/interpretation, program design, and program implementation, and led manuscript drafting and critical revision. Jennifer C. Benjamin and Kirstin Gracia Henley contributed to data acquisition, formal analysis/interpretation, program design, and program implementation, and participated in manuscript drafting and critical revision. Lindsay Cameron contributed to data acquisition, formal analysis/interpretation, and curriculum development, and provided critical revision of the manuscript. Diane Nguyen contributed to program operations and participated in manuscript drafting and critical revision. Satid Thammasitboon contributed to data acquisition, formal analysis/interpretation, program and

curriculum design, and program implementation, and participated in manuscript drafting and critical revision. All authors reviewed and approved the final manuscript and agree to be accountable for the work.

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