Implementing Interprofessional and Citizenship Education in a Regional University: Carving Paths, Crossing Boundaries in Complex Adaptive Systems

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Content

Introduction

Barr et al[1], Carpenter & Dickinson[2] have argued that context helps define the content and strategies required to design, implement, and evaluate interprofessional education (IPE). Two aspects of context, strategic and theoretical, define the ongoing initiative we present

in this chapter. On a strategic level, this project is at the confluence of two opportunities at Université du Québec à Chicoutimi (UQAC): A relentless drive of the university's senior leaders to integrate interdisciplinary practice in teaching and research, and their firm commitment to strengthen the links between the university and its surrounding community[3]. Like other universities in North America, UQAC faces the challenge, amid shrinking financial resources, to ready its students in the health professions for the increasing complexity of chronic care, an aging population, and the higher digital connectivity and rapid transportation of people, goods and services[4, 5]. Although the current financial environment has placed discouraging challenges on several professional programs, by combining resources and aligning visions, partnerships between university departments and between the university and community organisations can help resolve some of these challenges. The present initiative seeks to leverage the strength of these joint alliances by adopting Inter-Professional and Citizenship Education (IPECE) as an organizing principle to prepare graduates in the health professions for collaborative practice and civic engagement, two essential skills sets in a rapidly changing and complex health care environment[6].

On a theoretical level, this project is founded on the premise that interprofessional learning and practice in chronic care emerge from what the patient, family members, and health professionals do to achieve specific health outcomes within the evolving opportunities and constraints of chronic illness. Both chronic care and interprofessional learning in this view are ecosystemic responses to illness—collective and more or less adaptive responses of the patient, family, and health professionals to the changing

biological and psychosocial manifestations of the illness[4, 7]. Such a complex view of care delivery entails uncertainty and higher levels of interdependence among all the participants—including their technology[8, 9]. In this context, interprofessional learning is about living communities of people who interact regularly; mutual and changing dependencies among several competencies; and challenges to adjust care strategies to the unique and changing demands of patients' illnesses and resources to meet them—all requiring a broad view of the encounter between patient, family, and health care professionals to nurture a balance between head and heart, cognitive and non-cognitive abilities, technical skills and insightful compassion, system design and ethical dimensions of professional practice[4, 7]. Meeting these challenges requires iterative interactions among participants rather than sequential handoffs; it requires not just flexibility and ongoing coordination, but also a collaborative and knowledge-intensive activity to connect and amplify the professional know-how of all involved into coordinating complex assessments and continuous interprofessional care that goes beyond biomedical needs[10]. This is an ongoing activity that subsumes a dynamic balance between knowing and doing: appraising and interpreting what is unfolding at any given moment and responding appropriately; recognizing the right thing to do and doing it at the right time with the right resources[5, 7]. At the group level, we call this ability Collective Capability that helps professionals deliver complex care and adjust their collective response to patients' needs over time. This is a learning process through which professionals tune their competencies to new circumstances and combine structure with renewed improvisations in the face of uncertainty, uniqueness, and conflicting values [7, 11-13].

These elements of context establish the rationale for joining disciplinary boundaries and for carving paths toward a more socially embedded university. They also raise several questions: How can we translate these elements into designing an Inter-Professional and Citizenship Education (IPECE) platform? What kind of leadership do we need to cultivate the necessary alliances and create a shared vision for the future? What learning experiences to implement, what disciplinary boundaries to join and what local resources to engage for our future health professionals to become team players and engaged citizens ready for complex care delivery? To answer these questions—and given the scope and novelty of the project—we opted for a gradual approach to design and implementation conceived as knowledge generation processes on their own. In the following pages, we describe our methodology focusing on the principles of program design, leadership, and the formative evaluation we are using. Next we report what we are learning from this developmental work, and conclude with future directions.

Methodology

At the heart of our rationale for crossing multiple disciplinary boundaries are two powerful sources of cross-fertilization: complex chronic care delivery as an ecosystemic response and the collective capability it entails[4, 7]. It is our premise that these concepts offer accurate signposts for the complex requirements for interprofessional learning, particularly when IPE is enriched with frontline goals of community improvement and civic engagement[7, 14]. As we have argued elsewhere[7], we cannot predict nor design this type of collective learning. But we can design for it[4, 7].

Principles of IPECE Design

Chronic care activities are rooted in the biological, psychosocial, cultural, and dynamic realms of human experience. As such, they raise issues of shared meanings among the participants[4]. And so does collective learning[10]. Collective learning is known to be experiential, happens in specific social contexts, and is driven by the idiosyncratic motivations of participants[7, 15, 16]. As living structures, communities of interacting individuals are better conceived as complex adaptive systems with interdependent parts – individuals and health technology components – joined together to form an emergent structure that cannot be predicted from the parts[5]. In such contexts, an ecosystemic approach highlights 3 units of analysis: the group of participants (teachers, tutors, students, patients, family members, community organisations), their environments (biological, psychosocial, health care organization, university department, family unit), and their adaptive responses[4]. The primacy in this triad goes to the adaptive component: the evolving arrangements of mutual dependencies and linkages among the participants and their environments. These linkages are likely to be effective when they allow the participants to act as a unit, with shared goals and meaning, mutual understanding of the contributions of each participant (representations, emotions, skills, behaviors), and well timed communications[17]. Collaborative practice and collective learning in such contexts imply shared knowledge, trust and respect for the autonomy of participants, and a shared set of values regarding appropriate responses to shared definitions of need[17, 18]. How then can we integrate these features into our conception of IPECE design?

Two perspectives are necessary[4]. Both draw on Human Ecology, Complexity Theory, and Activity Theory[19-22]. The first, designing for community, harnesses the potential of

relationships. The second, designing for emergent learning and practice, focuses on collective learning over time.

Designing for Community

Designing for community implies that the participants cultivate cohesive relationships through regular contacts, definition of common goals, and recognition of shared skills[23, 24]. Such relationships evolve best from small groups who build trust and cohesiveness by identifying their joint interests to cultivate what Wenger calls a community of practice[23]. Guided by the type of knowledge required to accomplish tasks, these initial communities may then expand to include other members. An important corollary is that the encounters of the participants are also those of a learning community—a group of individuals who through language and conversations negotiate meanings and learn about each other and about themselves[23, 25]. A communal view therefore highlights the need to integrate the identities, skills, and resources of all the participants[23, 25]. It also underlines the co-creative nature of the group's response[19, 20].

Designing for Emergent Learning and Practice

Professional practice is an evolutionary process whereby only effective solutions can thrive under the constraints of cost, efficiency, and other human and organizational factors[26, 27]. The content of what community members learn results from their ongoing conversations and interactions with their environments. In this evolutionary process, successful solutions are likely to emerge as members adopt the best solutions through imitation of successful members or through an informed process of learning,

experimentation, and continual trial of varied solutions[5, 27]. To design for emergent learning means to provide an adaptive context that supports this kind of learning.

Two components of the social context of a community of practice are essential for an effective design: the relationships among members and the various products they develop and share[21, 22]—assessment tools, care plans, flowcharts, follow-up sheets, etc. In a sense, these artifacts help create order out of the free-floating brainpower of the participants; they give form to the group's experience and provide a basis for continual learning and experimentation.[21, 23, 24, 28] Designing for emergent learning and practice would then leave ample space for imagination, improvisation, and creative adjustment to the more or less predictable experiences of participants. To be anchored in the communal engagement of practice, imagination and improvisation would rely not only on periodic review sessions and keeping up with new technologies and evidence-based literature, but also on the development of an organizational culture that favors a sense of community, trust, and openness to experimentation and discovery[4, 23, 29]. Ongoing experiences with process change methods such as the Plan, Do, Study, Act cycles suggest that the "try it and see" attitude, combined with group processes and leverage on the health care organization through its senior leaders, is an essential element of successful collaboratives[4].

In summary, to cope with the complexity of the adaptive ecosystem of IPECE design, we must accept nonlinearity and unpredictability, incorporate the creativity of the participants, and respond adaptively to the emerging demands of the learning situations considered, the available resources, and the evolving encounters of the participants. The

goal is to guide and manage the communal response, recognize its value, and develop ways to document its collective and continual learning[27, 30, 31].

An Adaptive Leadership Model

UQAC, like other universities, incorporates decentralized departments and program units that embody diverse professional norms and boundaries of expertise[32]. The blend of stakeholders from program directors, faculty teams, tutors, students, patients, family members, and community organizations that would be involved in IPECE, all add to the complexity and ambiguity of both the processes of learning and the means to measure its outcomes, resulting in what Rittel & Webber[33] and Cuthbert et al.[34] call a Wicked Issue. The challenges of designing for community and emergent learning are then those of negotiating meanings in addition to those of dispersed communities, time, and fluctuating demands of the learning situations of IPECE. The challenges also reside in how to organize the relationships among the participants: how to coordinate, value, and leverage their engagement to the shared purposes of IPECE.

In this perspective, leadership is better understood as an adaptive process: the enactment of shared purposes through empowering and engaging individuals and groups in a collaborative strategy process[32]—what Heifetz[35] describes as mobilizing people to do difficult work with no clear technical solution: a relational process of collective change and motivation toward the progressive building of social capital[36], rather than the promotion of specific attributes of any one individual and without necessarily involving the authority of a traditional hierarchy. As Morill articulates it[32], leadership is here about

adaptive ‘sense making and sense giving’ within communities to help enact common values and pursue shared goals in response to change and conflict.

Description of the Case

Our case is based at UQAC, a regional university in Northern Quebec, Canada, with a range of programs spanning several departments: Engineering, Mathematics and Informatics, Health Sciences, Education Sciences, Humanities, Arts, English Literature, and Numeric Design. The first step in developing the case was the official creation in January 2014 of a steering committee to focus reflection and dialogue on IPE in the health sciences. This was the formal first step toward cultivating a community of people interested in this topic. It was also the birth of the possibility of developing IPE at the University. Chaired by the first author, the committee included initially program directors in the Health Sciences Department (Nursing, Kinesiology, Psychology, Physical Therapy, and Experimental Medicine) and any interested faculty member. Meetings were convened three times during the year and emails were exchanged throughout the project. The email list was quickly enlarged to include representatives from Social Work, the Education Sciences, and the Arts departments through contacts initiated by the Chair to stimulate discussions and expand the interdisciplinary effort to other departments.

Soon enough in the 2014 spring session, the conversations centered around two participants: the first author (representing Physical Therapy) and one of the Nursing Program directors. The readiness to develop a 3 credit IPE course joining pre-licensure students from Physical Therapy and Nursing and the convergence of interests in patient, family, and community-centered care were the initial ingredients that drove the conversations. The initial curriculum framework and learning objectives were determined by a mix of literature searches and structured conversations around the idea of combining patient-centered IPE with service learning[37] and reflective practice as tools for students to learn about teamwork and civic engagement. Initial plans were made to

develop a pilot project for the 2014 fall session to test this approach. The pilot lasted 4 weeks and divided 38 students from a second year nursing course on Family-Centered Care and 27 students from a second year physical therapy course on Professionalism into 13 interprofessional groups of 4 to 5 participants. Each group was to meet for a 1-2 hours interview with a chronically ill patient selected from a list of community organisations in the region. The patients were invited to tell the students their lived experience with chronic illness. Students were in charge of working as teams, setting up their schedules, contacting the patient, organizing the meeting, and preparing the interview. Each student was to complete a self-reflection guide at the beginning of the course session, a few days before the meeting, after the meeting, and following a reflective group session at the university where students were to share their perceptions of teamwork and their experience listening to the patient. Initial contacts with community organisations, supervision of group meetings, and review of the reflective guides were jointly facilitated by the Nursing director and the first author. Students received credit for this assignment for up to 25% of their final grade.

In the winter of 2015, with the success of the pilot, discussions intensified around the design of a full-fledged 45 hours course that would cover all the IPE competencies identified at the national level[38]. The course would follow a thematic structure similar to the pilot with learning experiences centered on teamwork, service learning, and reflective practice. There was now the added option of involving students from a Distributed Medical Education Program hosted by UQAC. Several conversations with colleagues from the Arts, Education and Human Sciences Departments were also moving toward specific collaborative engagements to contribute to both teaching and research. These conversations were encouraging enough to have us prepare a proposal to UQAC Academic and Research Deans for the creation of the course. The proposal will follow the proper (elaborate) administrative procedure starting the fall of 2015 for a possible

beginning of the course in the 2016 winter session. Meanwhile, encouraging conversations with the deans (in a few formal but mostly informal meetings) clarified the need to gather as much data and evidence as possible to reflect clear priorities and goals regarding feasibility and the contributions of the course to participating professional programs, their faculty members, and the university's strategic plans. A scoping review of the literature of the last twenty years related to IPE combined with service learning and humanities education is now ongoing. And we still took time for an interdisciplinary workshop to gather some more data.

On June 17th 2015, a workshop titled 'Crossing Interprofessional Boundaries' brought together 9 faculty members from Kinesiology, Neuropsychology, Orthopedagogy, Medicine, Nursing, History, Ethics, Social Work, and Theater, all representing 4 UQAC departments: The Arts, Health, Humanities, and Education Sciences. The workshop combined perspectives from Activity Theory and Co-development pedagogy and provided a forum for exchange on interdisciplinary boundaries and patient-centered care as a collective competency. The workshop lasted a full day, was audiotaped, observed using a grid adapted from Engestrom Activity System model[39], and was one of the richest events in the history of the case.

A Transdisciplinary Framework for Evaluation

If our goal is to cultivate and manage, within the boundaries of our case, the communal response to IPECE design and practice, how can we inform the empirical investigation necessary to document our collective and continual learning?[27, 30, 31] We considered how our theoretical lenses—an ecosystemic perspective on chronic care, the collective learning it entails, Activity Theory and the Complex Adaptive Systems (CAS) view—might be combined to guide an empirical investigation and help account for the embeddedness, the contingency, and the central contribution of human agency in building

change.[13, 21] We opted for a transdisciplinary approach combining a realist evaluation[40] nested in a macro framing of CAS and Activity theory.[11, 21] As an analytic framework, realist evaluation assumes that variations in outcome result from the interplay between context and the mechanisms of change that a given intervention implements. The mechanisms of change in our intervention relate to the design for community and emergent learning and practice in the specific context of UQAC departments. Activity Theory, particularly in its view on educational research as formative interventions[21], draws attention to the longitudinal, economic, sociocultural dimensions of that context, including its artefacts, regulations, and interpersonal influences that give rise to change (the object of activity in educational interventions) and give it local meaning and significance (through the expansion and active reforming of the object of activity)[13, 21, 41]. Finally, a CAS view draws attention to simple rules in a system and its environmental parameters that can guide flexible transformation and allow for a formative adaptation.[5, 13, 19, 41]

Study Aims

Adopting a CAS, a realist and a formative view of educational interventions, meant that our evaluation would focus on the movement of change and whether it supports improvement.[13, 21] In particular, we found that the combination of intervention-focused and system-dynamic lenses would be most instructive.[13, 41] The intervention-focused analysis asks: what is our intervention doing? The system-dynamic analysis asks: what is changing? In our particular case, we wanted to explore the organic processes of adaptive leadership and emergent learning that result from our intervention. Our general aim in the

remainder is therefore to report a series of propositions to explain what we observe and whether the relationships and interdependencies among local agents are evolving in a positive direction.[13 41]

Study Design

Ethics approval was obtained from UQAC's Ethics Review Committee. The design is a qualitative organizational case study with multiple data sources collected reflexively and bounded by time and location of events.[42, 43] The study is also led by a team of investigators from different disciplines (Public Health, Education Sciences, Nursing, Physical Therapy, and Family Medicine). The study, still ongoing, was initiated in November 2014. We will report in this chapter on what we are learning from study events up to July 2015. We are building the case study from four main data sources: (1) Documents such as university strategic plan, course syllabi, and minutes of meetings; (2) Students' reflective practice from the pilot project; (3) Guided observation and audiotapes of the workshop; and (4) in-depth, semi-structured interviews with workshop participants.

Data Analysis

We are organizing the qualitative data into broad themes using our combined theoretical lenses. We are using themes from each successive student reflection, workshop participant interview and observations, or other free-texts including university documents, minutes of meetings, and other field notes, to enrich and modify the emerging account of the case using the constant comparative method[44]. We are now using narrative to synthesize our qualitative findings into meaningful accounts, generating theory and

teasing out ambiguities, with a particular attention to 'disconfirming cases': individuals or groups who do not fit our initial explanations. Keeping in mind that there is no such thing as a perfect data set in organizational case study, the emerging case study was nurtured most notably through discussion of the students' pilot study with collaborating partners and a presentation at the International Nursing Congress in Montreal on June 4th 2015. We are currently preparing our syntheses for workshop participants to obtain their feedback on the general thrust and specific details. This is not only because we need to enhance trustworthiness or credibility of qualitative data, but because human agency is a central source of change in educational research[21]. The content of this chapter is part of these syntheses. While some of what we are learning may be relevant in many settings, it applies most specifically to our case study. Therefore, we will state these learnings as general propositions that we will test in subsequent iterations and that others may adapt in their own institutional settings. Given space limitations, we will focus our review of lessons learned to exemplary parts of the pilot project and a few extracts from the workshop.

What We Have Learned So Far

Establishing IPECE in a university context led us to think differently about educational design and implementation, leadership, and research. We offer insights into two areas for those who participate in university-based IPE: (1) Learning about establishing IPECE for complex care in a university setting; and (2) Learning about adaptive leadership. In each

of these areas, we will examine what our intervention seems to be doing and what seems to be changing.

(1) Learning about Establishing IPECE for Complex Care Delivery in a University Setting

The context for learning is just as untidy in a university setting as it is in the front lines of health care practice[30]. There is presumably a coherent structure crystallized in curricula, syllabi, specifications of content, learning objectives, etc. However, the needs of faculty, students, committees, teaching units, departments can diverge due to differences in schedules, accountabilities, and disciplinary frameworks. Changes in curricula for example involve long series of negotiations. Governance at UQAC, like other North American universities, involves several department-level committees including undergraduate and graduate studies. Decisions made by these bodies need to be approved by the board of departments directors. In our case, the Physical Therapy, Nursing and Medical Education Programs must also be able to satisfy their individual accreditation standards with any proposed IPE curriculum—diplomacy, patience, unflinching resolve become central in this kind of work. As a self-help exhortation, this may sound all too familiar. But we are in fact learning that complex interventions in educational settings must respond and build on the energy of conflict, tensions, and contradictions wherever they may be—they are sources of change and development, and as such must be documented, explored, and understood in formative interventions[21]. What is our intervention doing in this regard? And what is changing?

Our intervention is focusing on human agency and creating a social context for its expression. By bringing together people with joint interests (in a steering committee, in small groups to discuss the pilot project, in a workshop to share and reflect on IPE concepts), we are in fact assembling embodied knowledge, tacit knowing, and local know-how that would otherwise remain dispersed. As reported earlier, it was the readiness to develop a 3 credit IPE course and the joint interests in patient, family, and community-centered care that helped crystallize the conversations between Nursing and Physical Therapy teachers into specific plans to try out new ideas for teaching teamwork and civic engagement. Differences in timing, contents, learning objectives, all had to be transcended and the conversations focused on new arrangements for when the students would meet the patients, what they would reflect on and when. We also had to establish new contacts with different community organizations and communicate with each other and across the divides between professional and non-professional, community and university-based structures and ways of being. Part of the change we wanted was in our own learning. We were in fact learning to do what we were asking our students to do, as this reflective comment reminded us:

"I think that because preparation for this work started late in the session, I think we were a bit lost and confused about what we were supposed to do. Students in Nursing had different information than we did, we did not really understand what we were supposed to do at the beginning and that got many of us stressed. I believe that if explanations were clearer and more detailed, that would avoid a lot of stress for the students."

This comment underlines also the need—as Cuthbert et al.[34] argue—for adaptive leadership and enhanced transparency about the complexities of IPE and service learning. We could not answer all questions and we did not have everything pre-planned. We were going to discover and learn with our students as we moved ahead.

Initially implicit in our efforts, our learning was slowly becoming explicit, and the workshop seemed a good place to expand it. So we gathered colleagues from different disciplines for one day to organize their conversations around one common task: understanding the requirements for individual and collective competence in patient-centered care. While crossing boundaries was externally enforced with students, it was voluntarily observed and diligently discussed during the workshop—another expression of human agency. For participants, the workshop seemed to have created a space for an interpretive dialogue, a collective conversation in which, as Engestrom put it, is provoked and sustained 'an expansive transformation process led and owned by' the participants[21, 39]. The following extracts illustrate an example of that interpretive dialogue around the concept of disciplinary boundary:

> *Researcher: [….] OK, let's have your inputs on what this idea of disciplinary boundary means. [….] What is it, or how do you see the limits between disciplines, or how you may have lived this concept in your field?*
>
> *Historian: I wouldn't use the word boundary. I have been teaching for a long time now, and in practice that's not it. In a small university like UQAC, we necessarily work together and there are no boundaries really…*
>
> *Ethicist: […] the problem is that for people who live inside the boundary, the specialist for example, can have difficulty to go beyond his way of seeing and he tends to bring back the issue within his boundary. That can be harmful…if we cannot work cooperatively with the other within his boundary, if the other does not understand that we are not here for a debate, for imposing his own boundary, but that we are here to co-construct or for say a constructive collaboration, as an end in itself, if we don't agree on that end, it doesn't work.*
>
> *Family Physician: […] I often need to do interdisciplinary work with nurses or in the hospital we have interdisciplinary teams, and all for the sake of patient care. […] I have always seen the boundary as a space for exchange; I have never seen it as a zone of conflict, but rather a zone for exchange. There is a kind of conduit between your disciplines, my discipline. We are all together in a shared terrain. We put things together because, what we're doing is try to help another person, an objective that is higher than oneself.*
>
> *Theater Director: In theater, there is the issue of the encounter and at the same time the loss and you have to play with these and remain flexible […]so it is no longer a question*

of interdisciplinarity, but rather a question of what is the medium? What medium will influence our language? As new media enter the scene in a theater (video, audio, etc) we ask the question how are these media changing our relationship to what is in the scene […] We still have our territory, but it remains open. But with this openness there is a potential for a loss. What becomes important is what we might call 'intermedium'. At some point, the encounter of two media creates a third space, an in-between space. So that's why boundaries are interesting to me, because it's a space for an in-between two, an interlude. […]in fact from the moment you institutionalize a creative space, you dominate that space and you're no longer in a responsive relationship with it.

Social Worker: I would like us to ask collectively how to get to the boundary, and how to dwell in it? Something like what you are saying (turning to the theater director)...anyway, that's how I hear what you're saying, but I think that to work in that space which is not a space to cross, a space to dwell in, to invest in, and a space in which there is, I think, a lot to invent, and perhaps, as you were saying earlier (turning to the psychologist) a space where you have to be careful not to oppose two kinds of logic: one that is to the care that needs to be delivered in the best of times and in the best interest of the patient, and one, of objects that perhaps are harder to grasp, less tangible, or perhaps more abstract as you seemed to say. I think we have some abstraction work to do in relation to our disciplines so that we can create a boundary object, an object that will be formed to the image, I would say, of what we are capable of being together. But honestly, it's been years that I'm teaching social work, and I still don't have an answer, I don't know…

We can see in these extracts an expansion and a progressive 'naming'[21] of the concept of disciplinary boundary. They also illustrate the cumulative "sense making" in a collective where similar ideas are developed under different labels and with different emphases. Most notable is the progressive shift and stabilisation of the 'we' in the conversation. Maintaining an interprofessional approach will require a continuous interplay between what is shared, what is evolving, and what may be co-created with one or more of the participating disciplines.[45]

(2) Learning about Adaptive Leadership

Leadership is not about suppressing conflict and does not necessarily reside in the conventional authority[35]. Adaptive leadership engages individuals at all levels in steering the change efforts; it also guides the communal response and recognizes its value. Among

the concrete values of the workshop was the expressed desire to continue the work started as a community of practice. This is an example of an 'emergent' event in a CAS that could not have been predicted. This was a call from all the participants (deepened in the interviews) to continue the conversations in support of IPECE. We take it as a sign of success of the design for emergent learning and the co-creation of an adaptive context that can support collective learning—the relationships among local agents seem to be evolving in a positive direction.

We see two additional benefits for the leadership of this initiative. One is that the members of this new community of practice are likely to contribute to an effective team of IPECE champions and facilitators with representations across a wide range of disciplines. The second is the potential for more fluid lines of communication across departments and across the university and community boundaries. As long as faculty and practitioners are willing to engage in learning, continually tune their competencies to new circumstances, and stimulate cultural and structural change, IPECE has a better chance of becoming central to professional preparation.[45]

Conclusion and Future Directions

We embarked with this project on a complex educational change to help prepare our graduates in the health professions for collaborative practice and civic engagement. To foster that change, we are focusing our efforts on engaging colleagues and developing alliances and partnerships toward the co-creation of a context that centers on human agency as the main engine—within identifiable constraints and opportunities—of educational change. In doing so, we are capitalizing on the interdependence between

cognitive and social dimensions of that agency to help mobilize and build on the knowledge, wisdom, and energy of faculty members, program directors, students, patients, family members, and community organizers—all stakeholders who adapt to daily challenges in their lives and work.[30] With this view, the co-creation and collaborative implementation of IPECE are necessary strategic requirements of sound educational design. They are also central to the process of research and evaluation that must take into account the open-ended, continually reconfigured nature of educational innovations.[21] Our analytic framework is emerging alongside our data collection, is informing our current analyses, and will add value to future iterations—a formative process to nurture an interpretive dialogue conducive to collective learning, leadership development, and continual course correction and feedback; a process that can help build a solid empirical knowledge base and enhance stakeholders' capability to engage and apply that knowledge.[5, 13, 21, 22, 27, 30]

Reflective Questions:

1. Tacit knowledge among students and tutors is difficult to capture, but it exerts a powerful influence on the effectiveness of IPE. What strategies can you think of to make it visible?
2. Educational research is often seen as a linear process with predetermined independent variables that are related to specific dependent variables (learning outcomes). Research in this chapter is adopting a nonlinear formative view, with an iterative, open-ended approach to inform data collection and analysis and link

it back to the participants. What advantages and limitations do you see in this view?

3. Science and technology are leaping ahead at an unprecedented pace. Universities are increasing their engagement with both to help make knowledge serve social needs and advance democratic citizenship. How would you see this approach implemented in your educational setting?
4. IPECE suggests an unconventional view on scholarship. How can IPECE be an incentive for faculty members in your institution in terms of teaching, research and service to the community?

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