Teaching, Learning, and Assessment Across the Disciplines: ICE Stories

Teaching, Learning, and Assessment Across the Disciplines: ICE Stories

Sue Fostaty Young, Meagan Troop, Jenn Stephenson, Kip Pegley, John Johnston, Mavis Morton, Christa Bracci, Anne O'Riordan, Val Michaelson, Kanonhsyonne Janice Hill, Shayna Watson

Edited by Sue Fostaty Young and Meagan Troop

Cover designed by James Young

Cover photo by Philipp Trubchenko on Unsplash

Dedication

This book is dedicated to Bob Wilson, Queen's University Professor Emeritus, assessment maven and mentor extraordinaire.

Contents

Chapter 11. ICE as an Educational Development Tool

Prologue/How to read this volume

This book is a testament to the pedagogical generosity of its authors. They want nothing more than to share their excitement at having found a grounding framework that shapes their understanding of learning and at being able to purposefully and intentionally support their students' achievement. That common grounding framework is based on the ICE model (Ideas, Connections and Extensions). For those unfamiliar with ICE, Chapter 1 provides a brief overview, though it will also serve as a quick refresher for those of you who have used the model before.

The remaining chapters of the volume can be read in any order and in relation to your own emerging interests. To help make choices about what to read, each chapter begins with a description of the instructional context being presented. While the discipline depicted in a chapter might be vastly different from your own, many authors provide cues as to the ways in which their practices might be applicable, adapted, and/or transferable to other contexts. We suggest you keep your own context in mind as you read, staying open to ways of finding commonly held values and intentions that might inform your own ongoing teaching and assessment practices.

As a prompt to their writing, authors were invited to imagine sharing their experiences with ICE over coffee with a colleague. The result is a collection of highly individualized stories with the voices of each author deliberately retained with a conversational tone. The chapters, however, are designed in a consistent format that might help readers more easily find the details of most interest to them.

Chapter 1 provides an overview of the ICE model, setting the context and establishing the conceptual framework that influenced the teaching and assessment practices shared in subsequent chapters and explains the use of vocabulary adopted by ICE users.

Chapter 2 offers a rich portrait of the diverse applications of the ICE model in

the context of learning, teaching, and educational development, and illustrates a longitudinal view of the influences of the model and the resonance that it has had with Meagan Troop's principles of practice.

Chapter 3 features Jenn Stephenson's account of the ways that using the metaphor of a broken toaster to convey the essential underpinnings of ICE has helped the model's philosophy truly become "a mindset" for her and her students.

Chapter 4 Kip Pegley shares detailed descriptions of three distinct ICE-inspired learning activities he's used in teaching undergraduate students in his course on popular music and the ways those activities have enriched his students' learning experiences.

Chapter 5 John Johnston, a geoscientist instructor, and Meagan Troop, an instructional designer, examine their co-creation of an online course that applies the ICE model as a way to elicit different modes of thinking at the activity and with the course as a whole, elevating the learning and teaching experience for instructor, TAs, and students alike.

Chapter 6 Mavis Morton uses ICE extensively in both undergraduate and graduate courses and shares the multiple ways that she has engaged students and enhanced their metacognitive skills and awareness with their intentional application of the ICE framework in relationship to learning outcomes, activities, and assessments.

Chapter 7 Christa Bracci offers insights and reflections on her applications of ICE in the context of an Advanced Legal Research course. She illustrates the ways that the model offered curricular cohesiveness for students as they enhanced and developed research skills in authentic ways, as well as increasing their metacognitive awareness.

Chapter 8 As an instructor of the Lived Experience of Disability course, Anne O'Riordan details her creative integration of the ICE model to facilitate deep critical reflection through journaling and dialogue about the mentor-mentee relationships that formed in the course and in community.

Chapter 9 Val Michaelson and Jan Hill openly and candidly share Val's first experience implementing the ICE model. They outline the details of how an

undergraduate research methods course was structured and what they learned about teaching, learning and assessment along the way.

Chapter 10 Shayna Watson, a family physician, presents a comparative interpretation of the evolution of medical education by juxtaposing a Flexnerian perspective with one informed by ICE.

Chapter 11 In the volume's coda, Sue Fostaty Young outlines the multiple, embodied ways that her assessment-focused educational development approach has been influenced by ICE. She offers examples of the transformative effects of the ICE framework in facilitating enhanced communication and congruence in curriculum decision making for both instructors and students

Chapter 1. Introduction to the ICE Model

1.1 Getting Started

Sue Fostaty Young – Queen's University

Have you ever told a student that you were expecting more of an answer to an exam question or homework assignment only to have that student resubmit with more words or more pages but not more of an answer? Or had students come by for office hours, disappointed in the grades on their assignments because, according to them, everything in their paper was 'right'? Here, we share a model of learning and assessment that supplies instructors and students with a framework and vocabulary that facilitates communication about what learning looks like. In naming, framing, and providing a vocabulary, the model helps organize instructors' and students' thinking about learning and, in so doing, helps both groups become more purposeful in planning for the improvement of learning: the ICE model.

Extrapolate to novel situations; Postulate or anticipate outcomes; Understand implications of learning; Ability to hypothesize

Ability to: Articulate relationships; Relate new learning to what is already known; Combine two or more discrete skills

Fundamentals; Facts; Discrete skills; Steps in a process; Vocabulary; Definitions Information; Discrete concepts
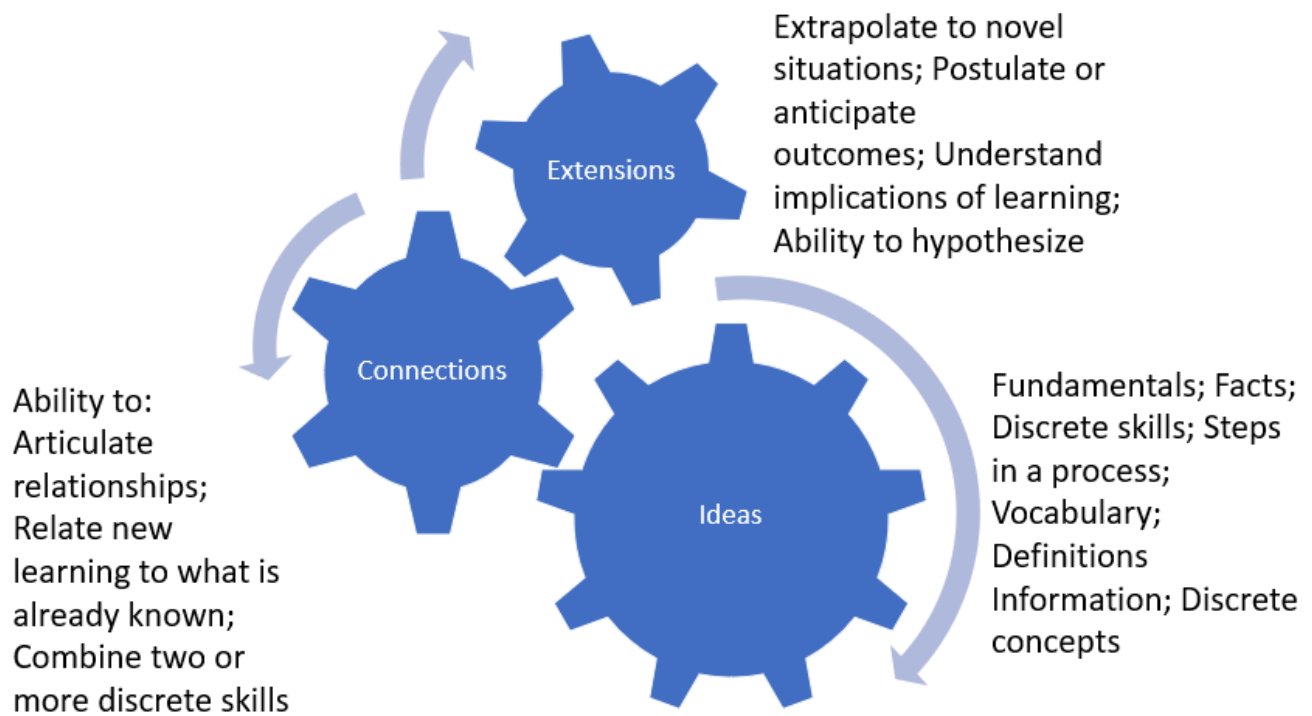
Figure 1. The ICE model

ICE is an acronym for Ideas, Connections, and Extensions – three qualitatively different frames of learning. The image above depicts each frame as an interconnected cogwheel. The intent is to illustrate that as change, or growth, occurs in any one frame of learning, the other frames are also likely to become susceptible to change.

Ideas can be conceptualized as the bits and pieces of learning. They are represented by things like discrete pieces of information, disciplinary vocabulary, steps in a process, and basic facts. Anything a student can recall, look up in their notes or in a textbook is an Idea. So, in history, for example, being able to recall names, dates, and events would be a demonstration of Ideas–based learning. In math, being able to complete 'plug and chug' equations accurately would indicate Ideas–based success. In an activity like basketball, it might be knowing the rules of the game or being able to perform a single, discrete skill like dribbling or completing a pass.

Figure 2. Terminology often used at the Ideas phase of learning. See Appendix for an expanded list

Connections are of two kinds – content-related Connections and those that involve personal meaning-making on the part of the student. In our history example, a Connection might be that students are able to articulate cause and effect relationships between historical events or perhaps begin to understand their own family's emigration patterns in relation to world events. In math, students might be able to select appropriate equations relative to the characteristics of a problem. And in basketball, players would be able to combine two discrete skills, like running and dribbling, into a successful, more complex function. We're hoping that, as you're reading this, you're thinking of your own instructional context, discerning the types of learning you're expecting from your students, or undertaking yourself. In doing that, you'd be seeking to make Connections of your own, to what we're presenting, through the process of meaning-making.

Figure 3. Terminology often used at the Connections phase of learning. See Appendix for an expanded list.

Extensions occur when students are able to appreciate the implications of their learning or develop the ability to use their learning in an entirely new context beyond the original learning environment. Using our history example, that might mean that students develop the capacity to interpret current events through new perspectives in ways that enable them to anticipate the evolution of global events. In math, the ability to make Extensions might enable students to create an equation as an expression of an unfamiliar problem. An Extension in basketball may be that a player becomes able to interpret play to the extent that they can pass to a spot on the court in anticipation of their teammate's position.


Figure 4. Terminology often used at the Extensions stage of learning. See Appendix for an expanded list

Important to note is that each set of examples describe different ways of being 'right'. So, going back to this chapter's opening scenario of students who produced accurate term papers in which everything 'was right' we can determine that they did well in conveying Ideas but the purpose of the term paper was likely for them to articulate Connections and perhaps even to push toward Extensions. One Business prof, disappointed in the calibre of responses to a case study assignment, explained it to his students like this:

> "When I gave you the case study to work on, it was as if I had given you a broken toaster. Some of you took that 'toaster' and pointed out all the pieces that were broken. And you were right, but you stopped there. A few others of you pointed out all the parts of the toaster that were broken and told me how the broken parts were affecting all the other parts. You were right, but you stopped there. Very few of you pointed out the parts that were broken, how those parts were affecting the toaster as a whole, and then told me how to fix the toaster and how to prevent it from breaking again. That's what I wanted to see in your approach to the case study."

> Adapted from Fostaty Young, S. & Wilson, R. (2000). *Assessment & Learning: The ICE Approach.* Portage and Main Press

The professor's explanation aligns directly with the frames of learning represented in ICE. Note that each frame of learning that's described, Ideas, Connections, and Extensions, represents a qualitative – not quantitative – difference. That is to say that students aren't being asked to do more of the same thing in each successive frame – they are doing qualitatively different things. Gaining a better grade on the case study assignment wasn't a matter of pointing out more 'broken pieces'; it required different frames of cognitive processing.

It's tempting to think of Extensions as being the most valuable type of learning and, in some cases in post-secondary education, that is the type of learning we hope to foster. That said, in being able to name different frames of learning we have the potential to become more purposeful in structuring the learning environment in ways that are aligned with our intentions for learning. There are times when it's essential for students to acquire *Ideas* and only Ideas. And as tempting as it might be to think that first year is for the acquisition of Ideas, second and third years are for Connections and that undergrads can't possibly be capable of making Extensions

until 4th year, consider learning as a non-linear, recursive loop rather than as a linear progression. If learning is recursive in the way that ICE conceptualizes it to be, then students, no matter where they are in their program, should be in a constant state of making Connections, and perhaps Extensions, then seeking out additional Ideas that contribute to the development of new Connections – and that the Connections and Extensions made in first year are merely qualitatively different than those made in subsequent years.

Instructors appreciate that in having ICE as a framework to organize their thinking about learning, they become better able to be purposeful in their teaching. They can plan instruction in ways that target specific frames of learning: lectures, short videos, or pre-readings to support the acquisition of Ideas; providing and inviting students to share examples of real-life manifestations of theoretical concepts or using classroom learning activities for meaning-making Connections; and inviting hypothesizing, extrapolation and asking "why do you suppose" questions as nudges toward Extensions.

ICE is a comprehensive model that captures a complex conception of learning and conveys it in a simplified, but not simplistic, way. It differs fundamentally from models like Bloom's Taxonomy. Whereas Bloom's conceptualizes three discrete domains of learning, ICE conceptualizes learning as an integrative process. Where Bloom's hierarchical model suggests that competence at lower levels is a prerequisite for success at subsequent levels of learning, ICE represents an ongoing, non-linear, non-hierarchical learning loop of developing expertise. From a Bloomsian perspective, it makes perfect sense that learning (and teaching) must start at the level of Remembering, hence the predominance of courses and programs that begin with fundamentals, memorization, and rudiments of the discipline. Because ICE conceptualizes learning in a non-hierarchical way, many instructors actually find it more beneficial to begin their teaching at Connections (with students' own experience) rather than with Ideas. Instructors' experience is that when students begin with meaning-making, they have an easier time retaining Ideas. Without the foundation of relevance, students have no place to 'hang the Ideas' so they tend to lose them almost immediately after writing their exams. It's the active process of meaning-making where real (lasting) learning occurs.

Still, what instructors mention most often is their appreciation of the accessible

language of the ICE framework. They find that in having a shared language about learning it's easier to create a sense of community in their classrooms, virtual or face-to-face – a language that transfers across disciplines and that students are able to apply across contexts, even if an instructor they're working with isn't actively using the model.

1.2 Applying ICE

Sharing ICE with Students

Some post-secondary instructors are content enough to use ICE to inform their instructional and assessment practice but many more have recognized the benefits to students' learning when ICE is used as a common, shared framework. Some, like the Business prof mentioned earlier, use the analogy of the broken toaster at the outset of each term, others choose to co-create ICE-structured rubrics with their students' input; still, others invite their students to create and submit exam questions that invite Ideas-focussed or Connections– or Extensions–focussed responses along with promises that some of those questions will find their way onto quizzes and final exams.

Once students adopt ICE and orient themselves to learning and what it looks like, they quickly begin to use the language and framework that the model provides. They become better able to self-regulate and plan for improvement through a heightened ability to self-assess. We've heard from students that they continue to use ICE, even in courses where their instructors aren't using the model, because the framework helps them organize, plan and improve their learning. In fact, when some undergraduate students at my home institution experienced the positive effects of ICE on their own learning, they collaborated to produce a video as a means of supporting the learning achievement of their peers. You are invited to view the video which opens in YouTube: A Student Introduction to the ICE Model. A described video transcript is also available (click to download— A-Student-Introduction-to-the-ICE-Model-Described-Video-Transcript).

Writing Learning Outcomes

The language of ICE reflects the qualitative differences among the three frames of learning. Words like recall, define, calculate, identify, imitate, and describe all connote Ideas-based learning. Words like code, diagram, categorize, translate and relate refer to the process of Connections. Extensions can be conveyed through words like anticipate, critique, design, propose and interpret. This type of purposeful

language use means that instructors become better able to articulate learning outcomes that guide their students' orientation to course material. For example, the learning outcome "Students will understand potential complications to a neurological event" is vague and open to interpretation – what exactly does "understand" entail? Using ICE as a framework for learning, instructors can be more intentional about their expectations for learning through selecting precise language their learning outcomes. For example:

By the end of the course students will be able to:

- **List** potential complications of neurological events (for intended Ideas-based outcomes)
- **Recommend** treatment of potential complications arising from neurological events (for Connections-based outcomes)
- **Predict** potential complications of neurological events (for Extensions-based outcomes)

Designing Instructional Strategies

Instructors find the precision of language that comes from their ICE-informed learning outcomes also has a positive spill-over effect on their ability to purposefully design instruction. Because they've taken the time to determine what "understand" is supposed to look like in their course, they can better structure the learning environment and activities to support their intentions. The chapters that follow offer rich descriptions of ICE-informed teaching that supports intended learning.

Designing Assessment

It isn't uncommon for post-secondary instructors, after learning about ICE, to make the realization that while they were expecting their students to demonstrate Connections or Extensions, their assessment design was actually heavily focused on Ideas. In fact, some have made the realization that their assessment design and exam construction may actually have prevented their students from demonstrating the full breadth of their learning. To mitigate against those pitfalls, the authors of some of the chapters that follow share their authentic approaches to

assessment that helped to focus their students' attention on meaningful learning and increased the relevance of the content under study.

The presented chapters that follow in this volume are filled with the different ways that instructors have shared ICE with their students and the ways that students have maximized the portability of the model, adapting it for their own use in different learning contexts and across disciplines.

References

Fostaty Young, S. & Wilson, R. (2000). Assessment and Learning: The ICE Approach. Portage & Main Press.

Chapter 2. The Evolution of ICE in My Practice as Teacher, Learner, and Educational Developer

2.1 Instructional Context

Meagan Troop – Sheridan College

It was truly serendipitous that Sue Fostaty Young and I met when we did. She inspired me to pursue a career in educational development and became my mentor as I entered the field. Almost a decade later, her friendship and guidance remain invaluable. I've been at Sheridan College since 2017, first as a faculty member and educational developer and currently as an administrator, leading a dynamic team of educational developers. As an early career educational developer, I gained experience from several universities and colleges as a contingent instructor and an educational developer hired on a contractual basis. The varied and diverse roles and contexts that I've worked in and across as an educational developer inform my conceptions and applications of the ICE model. In this chapter, I will map out the intersections and influence that the model has had on my teaching and learning, and by extension my approach to educational development.

2.2 Discussion

My ICE Origin Story

I first came across the ICE model as a master's student at Queen's University. My professor at the time, who was teaching a Qualitative Research Methods course, used the ICE model as a framework for a rubric tied to a major assignment. The assignment was multi-part and required us to observe a teaching and learning scenario, take field notes, conduct a follow-up interview with an instructor, analyze the data, and write a final report. These tasks were critical learning opportunities in developing the skills, mindsets, and knowledge for conducting research in a trustworthy manner.

The Ideas that were shared in the final report highlighted my descriptions captured through field notes, the interview, and observations, and the Connections appeared as my interpretations made through the conceptual lens of the theories that I connected to as well as my own lived experience. This process helped me to make sense of the data in light of the contextual factors in the teaching and learning scenario. Finally, the Extensions involved the weaving of multiple sources in my paper were critical in the reporting process to highlight a triangulated approach in answering questions of interest. And further in practice, this meant that I was expected to draw on multiple, diverse perspectives from the scholarly work in the field and begin the work of theorizing and finding my own academic voice in the process.

The assignment instructions were detailed, and the rubric was qualitatively descriptive about learning, intentionally mapped to each frame of Ideas, Connections, and Extensions. The ICE framework helped to elicit and prompt an in-depth analysis of the situation with rich interpretations of the data collected. And with a clear characterization of learning at each level, I was able to intentionally process new information and events, uncover patterns and themes, and then systematically make sense of how they might apply to other scenarios and contexts of teaching and learning.

Teaching and Learning as an Adjunct

Following graduate school I worked as an adjunct instructor and educational developer at a number of institutions in Ontario. Now assuming a facilitator role to both students and colleagues, I found that the clarity provided by the ICE model had a transformative effect on the ways that I was able to communicate the scope and nature of the learning in each of these contexts.

Many of the courses that I've taught as an adjunct professor were in music education, which focused on exploring notions of teaching and learning through various experiential activities. For example, I would have the learners participate directly in an activity that they might use in their own classes. One activity that I often included in the music pedagogy course was the creation of a machine using only sounds and motions that learners create with their bodies and voices. The ICE model became an intuitive way to conceptually and contextually experience the recursive process of making their machine. With each machine, they began with an Idea or concept expressed through various musical elements (rhythms, timbre, dynamics, melody). Students were required to make intentional choices about what kind of machine and what types of sounds they might explore in the process, and were asked to connect Ideas across individuals and domains (physical/cognitive/emotional).

In this activity, one of the main themes to convey pedagogically was the notion of gestalt in music teaching and learning; that is, the sum of the parts is greater than the whole. This concept applies to many cases and examples in music education where ensemble work is involved. In facilitating Connections, many students considered questions and explored curiosities related to the combination and complexity of sounds and further experimented with the manipulation of various musical elements and their effect. Finally, the Extensions showed up in a deep, reflective process, both through writing and dialogue, when students shared the ways that music-making activities intersect and influence the self, the collective, and the field of music education at large. Overall, the students' dynamic exchange of individual Ideas expressed initially through sound and movement became an interwoven series of connected stories and theoretical threads that led to a collaborative dialogue about significant themes of teaching and learning, both musical and extra-musical in nature.

Another instance in the music pedagogy course, where I was able to engage learners through ICE involved the co-creation of a rubric. In this case, the use of ICE conceptually enabled congruence between theory and practice, and became an opportunity for students to share lived experiences from their Bachelor of Education courses and their practicum field placements. In our co-creation of the rubric, a process informed by Andrade's work (2005), we started with a draft rubric, which we used as a starting place upon which we could build a shared language and engage in consensus making.

We deconstructed the language and explored their conceptions of various concepts and terminology. This collaborative process encouraged students to think about their own conceptions of teaching and learning in relation to the experiences in the music pedagogy course, and in the Bachelor of Education program. As we worked through examples and shared experiences of what learning looked like, felt like, and sounded like at each of the three frames of learning in the rubric–Ideas, Connections, and Extensions–students reported eureka moments when they experienced a familiar concept in an entirely new way. Each time a qualitative description was examined, we layered on complexity through a process of sense-making that involved challenging assumptions, and trying on multiple perspectives to arrive at new and meaningful understandings. ICE, as an organizing frame, enabled the group to go deeper and unpack what we were taking for granted once we'd developed a shared language. In support of a grounded and transformative process of learning, the ICE model provided an opportunity to organise our thinking about learning in a manner that bypassed theoretical abstractions in favour of accessible and inclusive acts of knowledge-creation.

An ICE Community of Practice: Cultivating a Process Pedagogy

In the summer of 2018, Sue and I invited a group of 12 faculty members from a variety of disciplines who were working at universities across Ontario to engage in a community of practice focused on the ICE model of learning and assessment. Over the course of two years, we met face to face and online, engaging the group in a series of educational development and interactions with one-to-one consultations, small group activities, and large group discussions. Because we wanted to honour the process as much as the outcome, we purposefully designed our interactions

and activities for this group with an educative mindset rather than an instrumental one.

Characteristically, educational developers envisage possible futures for transformative professional learning by creating spaces and places that are inclusive, reflective, and open. We set out to create spaces for reflection, mindfulness, and intentionality in the process pedagogy in putting together this book. Cultivating relationships, as well as inspiring and influencing enhancements in teaching and learning, are at the heart of the work that Sue and I do as educational developers. The ICE project has been one such opportunity to connect with faculty to learn with and from one another through stories of respective teaching and learning spaces. We noticed along the way that faculty participants gained greater insights into their own teaching practice and their students' learning, through the inquiry and writing process, and the act of articulating and exchanging stories.

The writing process initially evolved through the conceptual weaving of a variety of sources: Wilcox's (2009) work on self-study as educational development; Wyatt and Gale's (2014) exposition of collaborative writing as inquiry; Healey, Marquis, and Vajoczki's (2013) exploration of the Scholarship of Teaching and Learning (SoTL) through collaborative writing groups; and the Bowen theory-informed use of Teaching Triangles. In group conversations over the two-year span, there were moments that highlighted similar themes across cases, and also moments that emphasized the diversity and unique nature of the application of the ICE model. Some of our favourite moments took place when the conversation diverged in unexpected ways and we saw the ICE model playing out in informal aspects of participants' lives with windows of opportunity to share deep insights about teaching and learning practice with one another.

ICE as Educational Development

I started my career as an educational developer at the University of Guelph, where I met Mavis Morton, one of the other contributing authors in this book. As part of my role, I observed the creative ways that she incorporated ICE into a fourth-year seminar class and was blown away by the ease with which students were using the ICE model to articulate their own learning process. The focus on learning, as

opposed to grading, was facilitated through a thoughtful set of tools that included a rubric, aligned formative and summative assessments, and activities that enabled a level of critical and creative thinking that I had not witnessed before at the undergraduate level.

My next role in educational development, at the University of Waterloo, offered multiple opportunities to work closely with faculty one on one to co-create their online and blended learning experiences. It was at Waterloo that I met John Johnston, who I worked with in the design and development of his first year Earth Science course. It was the first time that John had developed an online course and the first time that I had worked with a STEM professor. We met on a weekly basis for over a year and worked asynchronously on various drafts of content. It was the ICE model, from my perspective, that offered a powerful way to communicate the development of student competencies and mindsets that would operate at a micro level of assignments and activities. As a framework, ICE conceptually held the course together and offered a transferability and extendability of key principles to several of his other courses regardless of modality. The ICE model ultimately provided John and his TAs, students, and co-instructors with a shared language that accurately depicted the nature and quality of learning expected in the course.

One of the courses that I examined in my dissertation as a graduate student was "The Lived Experience of Disability," which highlights Professor Anne O'Riordan as an instructor within the Occupational Therapy program at Queen's University, as well as Bill Meyerman, who was a long-standing patient mentor for the course. In her chapter, Anne speaks in detail about one of the critical course components, the reflective journal. As aspiring occupational therapists, the students were expected to use journals as part of preparing them authentically for professional practice. From the outset of the course, the deepening of thinking and learning was both subtly and overtly connected to the ICE framework with a thoughtful juxtaposition of the ORID (Objective, Reflective, Interpretive, Decisional) framework (Stanfield, 2008). What is also important to note pedagogically is the choice that was provided for students to express themselves in creative and critical ways in the journal through visuals, sound, poetry, and prose.

2.3 Impact

The informal education that I've gained through conversations and mentorship with Sue Fostaty Young has been nothing short of transformative and has involved so many facets of the complex work of educational developers. I continue to play and experiment with the ICE model as an educational developer in the design and facilitation of programming for faculty. The use of the ICE model has increased my confidence tremendously as it has grounded my practice with a systematic and evidence-informed approach to learning and assessment. It has validated much of what I was thinking and doing intuitively as an educator for the past 20 years of my professional career and provides me with a vocabulary to articulate the complexities and nuances inherent to teaching and learning.There are many models and theories that I typically introduce and share with faculty, but ICE is a model that I consistently come back to and include in any faculty development focused work in which I engage.

I have learned about the multi-dimensional ways the model has been integrated in diverse post-secondary teaching and learning contexts through the exchange of stories in our ICE community of inquiry. And I'm fascinated to work with these and other instructors who are experimenting with the model to create new applications to effectively bring ICE to life. Working closely with the ICE authors through the consciousness raising process of reflection and writing has been transformative for me as an educator. I am forever grateful for the ideas shared, deep conversations that connected us, and for the significant relationships formed that extend in and beyond our higher education community of inquiry.

2.4 Conclusions and Caveats

The ICE framework offers a conceptual model that is congruent with the principles of my practice in and across the multiple domains of teaching, learning, research, and educational development. Throughout my career I have used the ICE framework in various post-secondary contexts as a disciplinary agnostic tool as I've discovered that it often resonates with faculty and students alike. For me, it just makes good sense to start with an approach that intentionally aligns with my values as an educator and inspires me and the faculty and students that I work with to reach further and dig deeper in search of meaning.

References

Andrade, H. G. (2005). Teaching with Rubrics: The Good, the Bad, and the Ugly. College Teaching, 53(1), 27–30. http://www.jstor.org/stable/27559213

Fostaty Young, S. (2005). Teaching, learning and assessment in higher education: Using ICE to improve student learning. Proceedings of the Improving Student Learning Symposium, London, UK, 13, 105-115.

Healey, M., Marquis, B., & Vajoczki, S. (2013). Exploring SoTL through international collaborative writing groups. Teaching & Learning Inquiry, 1(2), 3-8.

Brian Stanfield R, (2008). The Art of Focused Conversation: 100 ways to Access Group Wisdom in the Workplace. Canadian Institute for Cultural Affairs.

Wilcox, S. (2009). Transformative educational development scholarship: beginning with ourselves. International Journal for Academic Development, 14(2), 123-132. DOI: 10.1080/13601440902970007

Wyatt, J., & Gale, K. (2014). Introduction to the special issue on collaborative writing as a method of inquiry. Cultural Studies Critical Methodologies, 14(4), 295-297. DOI: 10.1177/153270861430299

Chapter 3. Teaching Students How to Make Toast

3.1 Instructional Context

Jenn Stephenson – Queen's University

The ICE model (Ideas, Connections, Extensions) is more than just an assessment framework or a compositional structure for an analytical line of argumentation. ICE is not only a road map for an evolution from novice to master; it's a way of thinking, a mindset. This chapter describes how one instructor uses ICE as a valediction to move students towards an activist mode where applying ICE and "living in extensions" is an invitation to change the world.

3.2 Discussion

At the very end of the first ICE book is a section called "Sharing ICE With Learners." In that section, a story about a broken toaster is used to concretize Ideas, Connections, and Extensions as a developmental process of increasingly sophisticated and complex ways of knowing. Learning on this trajectory evolves from factual comprehension of fundamental elements to describing relationships among elements and sketching patterns of cause and effect. Finally, learners are able to extrapolate their learning to new scenarios and innovations.

In my post-secondary teaching practice, where students are adult learners and where self-reflexivity about how one learns is a central goal, this is the step that always comes first. So, on the second day of a new course, after we've discussed the syllabus and covered all the administrative course details, I share ICE with learners. I agree with the original storyteller of the broken toaster tale that one of the beauties of ICE is that it reveals a clear road map for each stage of learning, but at the same time the map does not predetermine the outcome of the journey. Not every student will be able to accomplish every step. Perhaps not yet. But it is important that each traveller has a map. And so, I have adopted and adapted the story of the broken toaster. Over the years, I have become oddly infamous in our unit as a devoted lover of broken toasters. It is now a cultivated part of my professor persona.

I tell the broken toaster story as a kind of fable with three parts. "Once upon a time, there was a broken toaster…" I tell them that a group of students encounters the toaster and they do an Ideas-based analysis. The group examines the toaster and identifies the particular part that is broken. They point and say "See, this is the bit that doesn't work." Then the second group does a Connections-based analysis. This group builds on the work of the first group. They take that information and upon further examining the toaster they are able to describe how this broken part is no longer connected to some other part and they know why the toaster doesn't work. Finally, a third group approaches the toaster, and they engage in an Extensions-level analysis: they note the broken part; they understand and explain why the toaster doesn't toast, and they fix the broken toaster. This is the punchline. Perfectly sound as a narrative structure, but actually not that funny, I admit.

After the story, I facilitate an application exercise. Students work in pairs or small groups to apply the ICE model to a series of subject-related prompts. The assignment asks learners to make a list of tasks they might undertake or a typology of research questions they might ask to elicit Ideas-, Connections-, or Extensions-based insights given a particular topic or data set. For example, in an arts management class, one of the prompts is "audiences, spectators, consumers of art experiences." In response to this prompt students might say that an Ideas-level task involves identifying audience members according to demographic features. And so, as part of processing the data from an audience survey, they might determine how many attendees fall into particular age or income brackets. Or they could ask about previous arts-going experiences. Or they could sort them by height or shoe colour. There are nearly infinite Ideas that could be generated to describe this phenomenon. At this step, it becomes apparent to my learners that the data gathering and sorting at the Ideas-level establishes critical parameters for the subsequent questions you can ask. The Connections-level task then needs to elaborate on the fundamental elements of the Ideas outputs. At this step, students might propose to correlate age against the number of arts events attended each year. Here they can see that by combining two Ideas elements, Connections are formed and the insights become more complex and meaningful. They might ask, do older people go to more arts events than younger people? Is there a prime age where arts attendance is maximized? Finally, they apply Extensions-type thinking to ask a new question. As incipient arts-administrators, they are invited to use the patterns revealed by Connections-type tasks to think about what might be done to either exploit or reshape these patterns. So, if younger people attend significantly fewer arts events than older people, what might be done to increase their attendance? Or, adding another correlative Connection for increased complexity, if older people have higher income levels, how can fundraising initiatives and patronage incentives be tailored to their preferences and interests?

Other authentic real-world prompts for this class included "architecture or geographical spaces of art institutions," "the staff of an arts organization" and "sources of revenue for arts organizations." In a dramatic literature class, the prompts might be "female characters" or "staging acts of violence" or "endings." This is a very simple exercise, and the students are developing prospective questions in advance of working with actual data, but the effect is to get them thinking about how Ideas are the bricks to build Connections which in turn provide

the structures to build Extensions. The journey from I to C to E is not just one of climbing higher – each level actually evolves directly out of insights gained in the previous frame of learning.

3.3 Impact

At the end of each year, usually in a first- or second-year core course where I have introduced ICE, the last day of class is Toaster Day. Toaster Day has become an annual ritual. Upon conclusion of that day's lesson, I send students away with a kind of valediction. I get out an old chrome pop-up toaster as a prop and I set it on a desk and I tell the story of the broken toaster again. By this point in December or in April, students are tired. They are overworked and overstressed. And for the most part, have forgotten why they are here, mired in the day to day struggle of simply finishing the year. This time through the story, the punchline lands with a different emphasis:

> "And so, they fix the toaster. Your job in the world is to be the kind of people who fix broken toasters. Because the world has a lot of toasters to be fixed."

The students get it. Whatever challenges they have overcome to attend university or conversely however thoughtlessly easy it was to get here, being here is a privilege and a gift. Reading great works of literature or bearing audience-witness to masterpieces of dramatic or musical performance and then thinking about them, writing about them, and talking about them is not what most people are doing with their day. I remind the students of the great gift of time that they have been given. I remind them that this university community that surrounds them is special and, as they pass through, their time here is fleeting. Beyond this, I point out that in this learning experience they are being enriched with skills, the skill of spiralling through from Ideas to Connections and from Connections to Extensions and from Extensions through again to still other Connections to generate new and different Ideas.

Studies tell us that the students are being enriched—monetarily—by a university education. Over their lifetimes, through the well-paid career paths opened by their university credentials, they will likely benefit materially. I remind them that these gains, whatever they may be, are not just theirs alone. I argue that they have a moral (if you will) obligation to use those skills for the greater good. This is the activist attitude that I mean when I talk to them about "living in Extensions." Partly this

is about the direct application of their problem-seeking, problem-assessing, and problem-solving. Partly this is about internalizing the sense of oneself as the kind of person who sees problem-solving as their responsibility. Being a fixer of broken toasters is the highest calling. It sounds funny, but I believe it to be true.

The reach of Toaster Day dilates through social media via Twitter posts and #brokentoaster. When I tweet that next Wednesday will be Toaster Day, my current students are mystified. But alumni and senior students – especially those on the cusp of graduation – become nostalgic. They too want to be reminded of that activist mission. Each year a small group of fourth-year students ask if they can drop in on the last day to hear the Toaster Story. Twice, I have been delighted by students who arrive bearing their own shiny chrome toasters in tribute.

Sitting down to write about the activist possibility of ICE and the calling to fix toasters, I sent a call-out on our alumni network to ask former students what the broken toaster story means to them. A common thread in their responses was acceptance of the challenge to think beyond the right answer, to embrace a problem, and to grapple with the "so what" of it all. They replied to tell me how it shapes their problem-solving practices as teachers, and as graduate students, and as editors, and as social workers, as theatre stage managers, and as parents. As one student wrote, "As a parent, I use it to help my kids understand some of the more complex ideas in life and to think beyond what they see right in front of them. It's helpful in creating a game out of problem-solving and encouraging them to think independently from a young age. ICE is a basic concept at heart but opens up a world of possibilities." Another student wrote from Afghanistan to report on her journey from studying ICE in a liberal arts program to actually going into the field as a humanitarian aid worker.

The alumni who wrote to me also remarked on how the broken toaster story made them feel. It felt to them that they were powerful enough to make a difference. It felt that what they did in their studies and in their lives after university mattered. It felt that they were challenged to step up. This is the intangible part of ICE that feels the most valuable to me. Embedded in the critical/creative thinking, problem-solving, developmental scaffold is an implicit message that it is our job to solve problems. In this way, ICE is profoundly activist. ICE is outward-facing to the world. It is socially engaged. Setting Extensions as the goal invites a broader view. Moreover, Extensions are value-oriented. When fixing toasters is the goal, we are called to ask

"What does fixed mean?" "What is the nature of making something better?" When we ask "so what?" and "who cares?" we determine the nature of care. We are called upon to care and to choose the things that we should care about.

3.4 Conclusions and Caveats

What do students think about this? What does the story mean to them? It is a call to action. It's a reminder that their education is not only about self-improvement and credentialization to move ahead in life—job training and getting more stuff. ICE is not only an evolution from novice to master but cyclical and pervasive; it's a way of thinking, a mindset—I'm not joking when I say that ICE is a way of living—a religion? I am a disciple of ICE. So, yes. I use ICE in my courses. Each assessment rubric uses ICE as its basic framework. I teach students to use ICE as a compositional structure for their weekly writing responses, beginning each 250-word analysis with an Idea, filling the body of the paragraph with their Connection, and concluding with one or two sentences that launch into Extensions. But it is more than that, the mindset of ICE, the challenge to live in Extensions, reminds me that what I do in the classroom has a higher purpose. There will be Extensions in the world beyond this week's assignment, beyond this course, and beyond this one discipline. My classroom is merely a practice ground for Extensions still to come. And even beyond the training in Connections and Extensions, my role is inspirational, to spread the gospel of the broken toaster, to plant an activist seed in the students to apply ICE and change the world.

Chapter 4. Three Ways to Use the ICE Approach in an Undergraduate Popular Music Seminar

4.1 Instructional Context

Kip Pegley – Queen's University

I was introduced to ICE in 2014. Initially impressed by its simplicity, I quickly learned that this straightforward protocol can help students read more deeply, make stronger connections between ideas discussed in the course, and learn to ask more probing and thought-provoking questions.

I am a music professor who teaches university undergraduate courses primarily in the first and fourth years of study and I use ICE for everything from helping students become stronger readers to discussing term papers. The approach helps them read more purposefully and helps frame their thinking to engage in discussion. For instance, when they first read an article within a fourth-year seminar, students are asked to mark an "I" in the margins when they encounter a new Idea; as they work through the course pack, they move quickly to indicating Connections between the assigned readings and eventually, they load their margins with questions that probe possible Extensions. This approach helps them read much more closely, relationally, and expansively.

Here, I outline three ways I use ICE in my seminars: 1) Spot ICE: where students identify Ideas, Connections, and Extensions in course materials; 2) Reverse ICE: working with older materials; and 3) ICE Speed Dating: reviewing term papers.

4.2 Discussion

Reading and Responding through the "Spot ICE" Approach

Many upper-level undergraduate students assume that they know how to read: they have done it for many years, and they have read a range of publications including discipline-specific texts as part of their university experience; reading, then, is simply not a skill they feel they need to develop. But with increasing demands on students–especially within a music programme where they are often overloaded with rehearsals and performances–it can sometimes be challenging for them to bracket out time for their academic courses. Students then resort to reading quickly, sometimes only glancing over words and skimming through ideas. But reading well—reading closely and deeply—requires time and, to their surprise, even a strategy. While there are many techniques that help students read more effectively, I have found the ICE model–with its accessibility and flexibility–useful for them as they break open a fresh course pack.

In particular, students in my seminars are required to complete four "Spot ICE" responses per term where I ask them to read each text with an eye to identifying the Ideas, Connections and Extensions, and mark up (i.e., highlight, tag) the readings accordingly. Early in the term I often see each letter ("I" "C" "E") in the margins, frequently with sparse marginal notes. Students are encouraged to write out their response after they first read the publication, which they can then use as an outline for their in-class response and class discussion.

The first response, not surprisingly, is usually the weakest (I only count their highest three responses, just in case they are absent one of those days and the first mark is usually the lowest of the four so it can be dropped when final grades are calculated). At this stage, the Connections students make are usually with previous in-class discussions or from their personal experience outside the classroom. Because students often resort to talking about their own musical preferences, classes can easily fall into opinion-based conversations. Accordingly, I instruct them to make Connections only with previous readings. This constraint challenges them to

engage more fully with the reading and less with their own habitual thoughts. I also restrict the number of Ideas they can cite, usually two at most; this is often challenging because students come to the course with past experience of being rewarded for identifying more Ideas in their writing, but with less depth. The emphasis on fewer, but well-explored ideas, exclusive of their own experience, moves them towards a deeper engagement with material that, only later, will be supplemented by their personal experiences.

What I find most remarkable about this process are the changes within the Ideas and Connections sections across the four responses, and especially within the Extension section. I invite them to populate this section by exploring questions such as: How would they extend the article? If the article is more than a year or two old, what else might they consider if they were writing it today? What are some of the article's omissions that could have strengthened it? Equally important is that they are encouraged to formulate this section by asking their own questions. By the final response they bring in none of their own personal opinions, are considerably more focused on specific Ideas and Connections from readings and their Extensions section is filled—filled—with questions, many of which, delightfully, I have not anticipated. Rather than "holding the floor" with their knowledge of the reading, often judging its merit by dividing ideas into neat "good/useful" and "bad/useless" categories, they are empowered instead to ask more thoughtful questions of the content. This replaces the drive to "master" the article with a desire to be vulnerable as they admit to and explore what they don't know. If, as Brené Brown writes, "vulnerability is the birthplace of love, belonging, joy, courage, empathy, and creativity,"2 then the ICE model helps us establish a safe environment within which we can understand vulnerability as central to intellectual growth, collaboration and generosity.

Reverse ICE: Working with "Older" Readings (a.k.a. Welcome to the '70s!)

An important benefit of the ICE model is that it helped me introduce students to a wider range of readings. Assigning texts by Freud, for instance, despite its limitations, usually isn't problematic: students often receive his writing like a primary text and are more enthusiastic because they feel like they are going to

"the source." When I assign articles dating from say, the 1970s through to the 1990s, however, students often comment that they are "old" readings and suggest that the ideas aren't as worthy of their attention as compared to more recent publications or primary texts. One quickly-rejected article that has shaped the field of feminist popular music studies is Simon Frith's and Angela Robbie's 1978 article "Rock and Sexuality." I would like to give a short introduction to this article and discuss how I pair it with "Reverse ICE" to model for students how to appreciate "dated" readings like this one–and read it with fresher eyes.

The central argument of Frith and McRobbie's article is that rock music is defined not only by its sound but also by its intended demographic audience (white), its form of production (commercial) and its ideology (that it holds more integrity than other genres). To illustrate, they present "cock rock" – stereotypically aggressive and often crude representations of male sexuality with assertive lyrics, loud dynamics and featuring phallic guitars (think Mick Jagger)—in juxtaposition to "teenybop." Teenybop, or what we now refer to as 'pop' music, replaces the hyper-confident male with the vulnerable "boy next door" (think Donny Osmond). Magazines like Guitar Player provided performance tips, and tablature for the budding amateur, encouraging boys to perform "cock rock" as well as listen to it. Teenybop magazines focused on tidbit details about what readers' (girls) favourite artists like to eat or how they relaxed on the weekend; they didn't provide girls with instructions on how to perform the music. The expectation was that the girls listened to their favourite musicians and imagined dating them.

Students tend to argue that the ideas presented in the paper may have been ground-breaking in 1978 but that it's been long established that boys and girls generally consume different music and in different ways. And, so what? With so many successful female pop stars like Taylor Swift and Katy Perry with net worths of 320 million and 330 million dollars, respectively, do we really need to worry about gender concerns as much as we did 40 years ago? To answer these questions, I introduce my students to the "Reverse ICE" Approach and invite them to imagine themselves, not as readers but, as the authors of the article. In other words, I don't ask them to identify the authors' conclusions but rather the main ideas from which the authors drew. As they sleuth through the reading and the end notes, they recognize that at least some of the authors' ideas were developed as they themselves consumed popular culture. How then did they then make Connections between this Idea and the existing scholarly literature? By reading further, students

then identify how well versed the authors were in a range of popular culture texts from music to lyrics and interviews and magazine. They learned that within the teenybop genre, females, romance, domesticity, and "the comic strip vocabulary of true love" were inextricably linked, an observation on their part that became a "building block" of their research. It brought their ideas into conversation with academic sources. Through further sleuthing, students then identified how the authors brought their ideas into conversation with academic sources and their burgeoning understanding of how the music that girls consumed shaped their lives as adults and especially how it functioned in the home and in the workplace.

Parsing out the article's Extensions then happens in two stages. First, I ask students to work in groups and find consensus surrounding the authors' most significant contributions. While Frith and McRobbie extended several intellectual discussions, students usually form consensus that their biggest contribution was to understand music as an ideologically-driven medium that affords the cultural industries a powerful means of constructing sexuality. In other words, popular music, even by 1978, was more than a form of sexual expression—it was a form of sexual control.

By this point in the process, I have met at least two of my objectives for assigning the reading: first, the article has served as an introduction to 20th-century artists (the Shirelles, Thin Lizzy, Bread) with whom the students may be partially or totally unfamiliar. More importantly, however, is that students have begun to realize that even though this article addresses music over 50 years old, very little, ideologically speaking, has changed.

I then move to the second level of the Extensions assignment by challenging students to imagine re-writing this article today. To this end, I ask them to "update" it by writing a hefty paragraph of questions—only questions—and extending them beyond gender to include race, class, and queerness (for starters). Below are some of the questions past students have posed:

1. Today, pop music allows for both white and black women, but rock isn't inclusive–why are black male rock musicians still so rare? What would happen to rock if blackness were more a part of this genre?
2. Why do we encourage young girls to buy music by pop musicians like Miley Cyrus or Britney Spears and then make them feel ashamed as adults for liking it? Why do we continue to think of "authenticity" as a working-class rock band

writing their own songs, playing their own instruments and driving in a van to out-of-town gigs? Does that type of struggle make them more "authentic" than someone who sings and dances and sweats breathlessly on stage? And if that attitude doesn't change, can female artists like Ariana Grande ever really be taken seriously?

3. Why do we have a category for "classic rock" but not for "classic pop"? What and who gets to be "classic" and why?
4. Can rock co-exist with queerness? With women? What happens to rock in the age of the #metoo movement? Can it survive? Do we even want it to?
5. How would future students update this article in 20 years? What will they see that we can't in 2021?"

Good questions. By inviting students to fill pages with questions, I observe them push their Ideas and, over the term, expose their intellectual gaps to become more gracious seminar participants.

The reverse ICE process allows my students to step into the "Rock and Sexuality" article and it facilitates their understanding of how the authors did their research; it helps them ponder how the article might be read in an as-yet unknowable future. By pairing this technique with this particular article, students learn not so much about what has changed within popular music over the years, but rather how little, ideologically speaking, has changed. Most importantly, the process helps them critique their own notions of progress as well as the means by which we are encouraged to measure it.

ICE Speed Dating: Working with Term Papers

In my seminars, two classes per term are devoted to working on term papers and once again, the ICE approach has proven very helpful. During the first of the two classes we focus foremost on Ideas by playing a game of "building-blocks speed dating." Students are paired for 20 minutes and for the first 10 minutes, one student presents the Ideas of their paper to their partner who "interviews" them and invites them to see new Connections. After 10 minutes, the students switch roles. When they are finished, one of them moves down the row and they each begin the process again with another student. After three pairs of students have

had the opportunity to exchange Ideas, we come back together, as a whole class, to discuss how, by making Connections with new content, their Ideas changed over the 30 minutes. Then, students with whom they did not directly speak are invited to provide feedback on how their new Ideas and Connections might be extended further, thus involving the entire class.

During the second "speed dating" class, several weeks later, we slow this process down and focus on Connections and Extensions. Now students are paired for approximately 30 minutes during which time they once again interview one another about the papers, this time with a student with whom they have not previously discussed their paper. I invite them to focus on Connections and think about the intellectual conversation into which they are entering. Who are the scholars asking similar questions and what is the discussion within which they are engaged? How then will your own paper contribute to these conversations?

4.3 Impact

Sharing ICE with students in an explicit way has drawn their attention to the mechanisms of their own learning. In structuring learning activities that invite students to experiment with identifying Ideas, making Connections, and exploring Extensions, ICE becomes a second-nature tool. Because we use the framework in multiple ways, students begin to appreciate the portability of the model across contexts and I'm hopeful that will mean they'll be able to make use of the approach in contexts outside our classroom. In the meantime, in our learning context, they have become increasingly able to pose deeper, more thoughtful questions and are developing greater skill in critiquing their own learning.

References

Frith, S., & McRobbie, A. (1990). "Rock and Sexuality," in Rock, Pop and the Written Word, eds. Simon Frith and Andrew Goodwin (New York: Pantheon Books), 317-332.

Brown, B. (2012) Daring Greatly: How the Courage to Be Vulnerable Transforms the Way We Live, Love, Parent, and Lead (New York: Gotham Books), 34.

Chapter 5. How to Think Like a Geoscientist: Using ICE to Support Critical and Creative Inquiry

5.1 Instructional Context

John Johnston – University of Waterloo
Meagan Troop – Sheridan College

How might we encourage our students to think holistically? As an educator at the University of Waterloo, I'm always striving to purposefully integrate holistic approaches by creating an intentional interconnectedness between knowing, doing, and being into our courses and programs in the Department of Earth and Environmental Sciences. Delving deeper into a series of complex, future challenges with a holistic approach requires a sense-making process whereby students are encouraged to explore something that is new and personally meaningful to them in relation to the world around them.

For the earth science courses that I teach, I was looking for a learning and assessment framework that would encourage students to accomplish these aforementioned outcomes and to think like geoscientists by inspiring spatial, temporal, field, and systems thinking. Geoscientists all over the world apply this innovative thinking to tackle the most challenging problems facing society related to changing climate, threatening natural hazards, and dwindling energy, mineral, and water resources. One of the solutions that we came up with to encourage holistic approaches was to intentionally integrate the ICE framework into the

design of a major cumulative assignment in the first time online offering of the Introductory Earth Sciences course. Applying the ICE framework facilitated a deeper learning experience for students as they explored their creative side and critically reflected on the quality of their work and their learning process.

The Earth 121 Introductory Earth Sciences course has been the gateway for geosciences at the University of Waterloo for more than 50 years. Classically taught in lectures since the 1960s, I started teaching the face-to-face version in the Fall 2014 semester with 300 students. In the Fall 2017 semester, I piloted my new online version of Earth Sciences with 100 students. Interestingly enough and quite unexpected, there were several students who preferred to take the course online rather than in the classroom as they were looking for flexibility and convenience. Both student interest and enrolment increased significantly after the first offering making the online version a sustainable option moving forward that would eventually replace the in-class version in the spring and complement the continued face-to-face offering in the fall semester until threatened by a global pandemic where the online class became the only option in fall 2020.

After teaching Introductory Earth classes for more than a decade at three universities as a contingent instructor, I embarked on a new journey to create my first online course with a team of experts (project manager, online learning consultant, digital media developer, and quality assurance specialist) at the Centre for Extended Learning at the University of Waterloo. The pedagogical design of the online experience was borne out of a series of critical, ongoing conversations over a period of a year and a half with the online learning consultant and co-author, Meagan Troop, and myself. This journey was incredibly challenging and time-consuming and it changed me personally and professionally. A major catalyst in this change process was the ICE framework as a means for supporting the alignment and articulation of my beliefs and values about Earth science education in practice and what I thought would best prepare students for professional geoscience practice.

The ICE model was applied as a conceptual framework in the design of the new online version of the Earth Science course. ICE offered a means to map and support the ways of thinking that would eventually underpin the entire online learning experience. More specifically, a major cumulative assignment in the course—the Study Site Assessment (SSA)—was designed with ICE in mind. The SSA encouraged

creative compilations of student-selected sites and uniquely reasoned arguments that diverged away from point counting individual ideas to a more holistic and authentic assessment approach. The assignment also aligned with the concept of thinking like a geoscientist; that is, in ways that consider spatial, temporal, field, and systems thinking. Since many students are accustomed to regurgitating isolated, unconnected ideas, we strongly agreed that there was a need to disrupt the status quo through the design of the course. As such, we explored ways that ICE could both encourage and support connected ways of knowing given that the Earth System is complex, dynamic, and constantly evolving, which has historically been particularly challenging for first-year undergraduate students in the Earth Science course.

5.2 Discussion

As we developed the course, a backwards design approach was used to align learning outcomes with activities and assessments. As part of working through this process, the ICE framework helped to facilitate my own process of connecting what seemed initially like disparate parts into a culminating assignment called "The Study Site Assessment" or the SSA. In the SSA, I wanted to deviate from the prescribed approach of a checklist of recalled Ideas and veer towards a holistic approach that invited creativity and deep learning through Connections and Extensions. To do this, we iteratively integrated the ICE model into a staged written assignment that both valued and honoured process work, which is usually rare in large-enrollment first-year classes because of the extra time to create and assess these assignments, including giving and receiving feedback.

The SSA was created to simulate a critical step at the beginning of any successful geoscience-related thesis, professional project, or recreational adventure and unlock student capacity to think creatively and in critical ways. Comprehensively investigating a study site before a site visit is often incredibly valuable because it can help alter objectives, approach, and save both time and money. In my own teaching, I often use examples to illuminate the value and rationale for engaging in this type of thinking. For instance, this is one example that I've often used with great effect: We were flying in a helicopter I was directing to conduct research in a remote location in Wood Buffalo National Park, northern Alberta. We received special permission to land and collect samples in an area where few people had visited. I thoroughly investigated the area by completing an SSA beforehand but it wasn't until we were hovering in an expensive helicopter over terrain that we could not safely land on that I got nervous. We were near the limit of gas to return safely and every moment of indecision cost money from a competitive University of Waterloo Water Institute seed grant and induced stress with our equipment and crew of three, an undergraduate student, First Nations community member, and me. At this moment I redirected our project "on-the-fly", seamlessly adapting to land on a different part of the shoreline sequence and redirecting one aspect of the objectives in this unique research that I proposed. I attribute this quick response that saved our research trip to completing an SSA beforehand. The SSA forced me

to not only prepare beforehand but prepared me to think creatively and critically before we even started fieldwork, forging a path forward that was uniquely my own and an integral foundation to problem solve while in the field.

The SSA is purposely separated into three parts (A, B, and C), each framed by the ICE model. For example, in part A, the Ideas element is represented in the description of the location site. The ideas build in the second instruction that asks students to both list and then to justify their reasons for choosing the site, therefore facilitating Connections. Finally, students in the final step of part A, need to demonstrate different ways of thinking like a geoscientist in a sense-making process that requires them to make Extensions beyond the site itself. A similar process was taken in the design for parts B and C of the SSA. This structure is meant to help students better manage this large compilation worth 25 percent of their overall mark in the course, align with the timing of class learning modules, and build similar elements that support student improvement and mastery. Students are provided these instructions for the SSA:

Instructions:

Chose a parcel of land anywhere in the world to study. Ensure that information is available for the following topics: Rocks (composition, structure, processes) and Time (age). Your selected location could be somewhere you grew up, the cottage, a favourite fishing spot, or even a randomly chosen area.

Compile each of the items below. Each should include text and visuals (annotated photographs, drawings, figures, or maps) that clearly explain what is found at your study site. Be sure to properly cite any sources of information in APA format.

In this culminating assignment, Part A was specifically created as a low-stakes entry for students (worth five percent of their class mark) and provided an opportunity for Idea generation. This initial phase encouraged students to connect their chosen location to the world at large. Further, students were required to offer a well-reasoned argument that demonstrates effective spatial thinking for the location for their selected site. Assignment instructions are included here for Part A:

PART A: DESCRIPTION OF STUDY SITE (5%)

Description of Study Site:

1. Describe the location (e.g. latitude, longitude, and relative location)

2. List and justify your reasons for selecting the particular site.

3. Demonstrate that you're thinking like a geoscientist by including three figures with associated text descriptions. These descriptions should demonstrate effective spatial thinking (e.g., relate two and three-dimensional aspects and various scales and the significance of these relationships).

Parts B and C are more comprehensive than Part A (each worth ten percent of their class mark). The assignment design provides enabling constraints; more specifically, by including pages and text limits, as well as the guiding criteria for the assignment using the ICE framework, students are encouraged to exercise their agency and judgment. Part B encourages systems thinking with unique adaptations of the rock cycle to create a novel and well-suited SSA to the location choice. Assignment instructions and descriptions are included here for Part B:

PART B: COMPOSITION, STRUCTURE, AND PROCESSES (10%)

Composition and Structure of the material and Processes that contributed to their formation:

1. Identify the type of rock at your site. Use the rock classification framework and the rock cycle to assess the type of rock that you're working with. Refer to Module Two: Rocks for help.

2. Cite the sources that you use to determine your rock.

3. Write a compelling argument of your classification of the rock.

4. Create a unique adaptation of the rock cycle that includes the rock from your study site.

5. Your depiction should be supported by a text-based argument that illustrates a clear understanding or systems thinking (as it relates to the Earth System) and a rich context for your study site (i.e. the individual parts of the system and the interconnectedness between parts of the system)

Part B should be 3-4 pages (750-1000 words) in the length of text, not including figures.

Part C encourages temporal thinking with unique adaptations of the geologic

timescale to create a novel and well-suited SSA to the location choice. Here are the detailed instructions that students received for the completion of Part C:

PART C: AGE OF THE MATERIAL (10%)

Age of the material:

1. Identify the relative and absolute (numerical) age of your chosen rock. Refer to Module Three: Time for help.

2. Cite the sources that you use to determine the age.

    • For more information about citing sources, visit: UW library: Citing Sources.

    • For more information about how to cite maps, visit: UW library: Maps – Geospatial Centre.

3. Write a compelling argument for the age of your rock.

4. Create a unique adaptation of the geological time scale that accurately contextualizes your chosen rock.

5. Your depiction should be supported by a text-based argument that illustrates a clear understanding of temporal thinking (as it relates to its place in Earth History) and a rich context of your study site.

Part C should be 3-4 pages (750-1000 words) in the length of text, not including figures.

The connections between Parts B and C were important to make clear for students in the assignment design. There is a parallelism that exists in both phases that enables students to develop competencies and skills that are transferable to a variety of contexts. Here we apply these ways of thinking in the geological realm, nevertheless, the strategies and approaches that students will grapple with as part of this assignment hold the potential to prepare them for tackling some of the challenges facing society.

5.3 Impact

Although our team of experts created a thorough description and set of instructions for the SSA assignment, many students continued to seek advice because of their dependency of following a cookbook approach that was driven towards point counting assessments. We—myself and the teaching assistants—commonly noticed students taking a prescriptive approach to their work. In these cases, these students were often challenged to conceptualize the assignment holistically through suggested strategies and interactions with myself and the teaching assistants, which meant they were encouraged to pause, reflect, and think deeply about possibilities, and strive for unique, interconnected approaches. The ICE model was a critical part of encouraging students to be open to these new ways of thinking as it supported them, for example, in a process of selecting a unique study site. Freedom to select any site in the world, although overwhelming for some, provided students with an opportunity to engage in novel, creative activity and the ways of geoscience thinking.

The ICE model formed the basis for the SSA rubric used in this assignment, providing a consistent guiding framework for students, instructors, and teaching assistants, especially important for large classes, such as Earth 121. These rubrics encouraged students to extend beyond listed instructions, tapping into their own creativity by incentivizing unique quality work and learning characterized at each phase of the rubric. Each rubric for Parts A, B, and C was intentionally created to align with different ways of thinking for geoscientists and mapped directly to ideas, connections, and extensions.

Idea generation in student work was assessed using the rubrics shown below. The rubric as an assessment tool helped students to move beyond presenting disparate ideas to experiment with creative elements. As an instructor, through my reflections and observations, I think that Connections in all three SSA rubrics motivated students to explore and experiment, striving to piece together a well-articulated context for their carefully selected rock and study site. Extensions in the ICE framework, incorporated into each SSA rubric encouraged and rewarded students for successfully creating compelling arguments independently. A compelling argument, no matter how different they may be from one another,

could be evaluated consistently and accurately among the instructor and teaching assistants using the ICE framework. Diverging away from a list of items to complete, students slowly embraced the freedoms afforded by the holistic rubric, especially as we progressed from parts A to B and then C.

	Ideas	Connections	Extensions
Part A: Description of Study Site	• Accurately locate and describes the chosen study site. • Compiles the illustrations and associated text. • Assembles a list of reasons for the chosen site.	• Synthesizes text and illustrations to highlight relationships. • Integrates a variety of dimensions and scales.	• Proposes a compelling rationale and justification for choosing their site. • Uses spatial thinking to communicate the significate between identified relationships.

Figure 1. Part A of the Rubric

	Ideas	Connections	Extensions
Part B: Composition, Structure, and Processes	• Accurately describe and effectively communicates the type of rock at the chosen study site. • Identify and label the correct location in the classification scheme and rock cycle. • Sources are cited according to APA style.	• Synthesizes text and visuals to articulate relationships. • Applies systems thinking to illustrate the context of the chosen rock to the rock cycle.	• Justifies, thorough writing, the classification of the rock type. • Creates a unique adaptation of the rock cycle that provides context for the chosen rock. • Systems thinking is used to defend the interconnected nature of the relationships within the Earth System.

Figure 2. Part B of the SSA Rubric

	Ideas	Connections	Extensions
Part C: Age of the Material	• Name and numerically describe the age of your rock. • Accurately place the age of your rock in the geologic time scale. • Sources are cited according to APA style.	• Synthesizes text and visuals to articulate relationships. • Applies temporal thinking to illustrate the context of the chosen rock to the geologic timescale.	• Justifies, through writing, the placement of your rock in the geologic timescale. • Create a unique adaptation of the geologic timescale that provides context for your chosen rock. • Temporal thinking is used to defend the interconnected relationships with Earth's history.

Figure 3. Part C of the Rubric

Through a phased approach of giving effective feedback, each in parts A, B, and then C, students demonstrated significant improvement in the quality of their thinking, which by their accounts was a result of both individual written feedback on several assignments and general listed feedback to the entire class at each stage of the SSA. The instructor and teaching assistants met during and after evaluating each stage to ensure a robust and reliable approach to giving feedback. We attempted to purposefully provide more feedback to students in Parts A and B to help them develop their deep and creative thinking and to enable improvement in this cumulative SSA assignment. A list of future considerations for the entire class was created at each stage, as well, and posted to help guide students when reflecting on their own submission after providing feedback to facilitate continuous enhancement. We challenged students to: (a) carefully read their feedback, (b) critically reflect upon their submission, and (c) thoughtfully re-examine assignment instructions and the ICE rubric to identify key areas for improvement on their own before contacting the instructor or teaching assistants.

The most significant struggle as an instructor of a large and continuously growing online class was making the case for additional and qualified teaching assistants. The rubrics I developed, based upon the ICE framework, were able to draw out deep and creative student work but I quickly realized I needed to screen and train teaching assistants to ensure they could proficiently assess and evaluate holistic

submissions by students. Not only did I screen teaching assistants for subsequent offerings of this course, I added discussion and resources to better understand the ICE model (Fostaty Young 2005 and Vesely 2017). Disseminating these resources to students before assignments helped establish a frame of mind for students to extend beyond Ideas and create Connections and Extensions and help teaching assistants prepare for grading. Resources and discussions with teaching assistants evolved throughout their training and development and led to iterative improvements in the SSA.

Many teaching assistants appreciated that they could consistently evaluate unique compilations among a large class without getting "lost in the weeds" of unconnected words and sentences. During our weekly teaching assistant meetings, I often heard how easy the ICE rubric enabled the identification of good quality work and attribute a good mark for such a variety of deep and creative thinking. Many teaching assistants also mentioned that this assignment and associated rubrics improved their own writing and ability to formulate quality submissions in their classes or for their own theses and publications.

As the instructor, I have been profoundly changed by the ICE framework because of its utility in inspiring students to think deeply and autonomously as they craft unique masterpieces, wherein visuals and text come together in a synergistic manner. I believe this learning process is critical for students to engage in as we evolve as a contemporary society as it offers an opportunity to be informed about the role that each person plays in the dynamic and complex Earth system to which we belong. The ICE framework supports my personal and professional belief that we must strive to move from a surficial view to the greatest depths of the Earth and ourselves to unveil the dynamic interconnectedness that the Earth System offers to those who strive for meaning and belonging.

5.4 Conclusions and Caveats

The ICE approach provided a guiding and organizing framework for online course design as it offered a holistic way of knowing, doing, and being that aligns with the complex thinking of a geoscientist. These ways of thinking, namely spatial, temporal, and systems thinking, help prepare students when they are immersed in natural or built environments, attempting to solve individual problems interconnected within the complex and dynamic Earth system. In geosciences, students grapple with the complexities and integrated nature of the Earth system. From our observations and reflections, the ICE framework supported a process of meaning-making within an ecosystem of online discussions, announcements, activities, reflections, and assignment instructions, all of which were attuned to the phases of ICE. Nevertheless, we discovered that students need to exercise agency and responsibility to mobilize all three phases of ICE. What started as a framework that guided our design of one assignment and rubric, eventually permeated our philosophical approach to significantly influence our approach to course design and development as a whole.

References

Fostaty Young, S. (2005). Teaching, learning and assessment in higher education: Using ICE to improve student learning. Proceedings of the Improving Student Learning Symposium, London, UK, 13, 105-115.

Monica Vesley. (2017). The ICE model: An Alternative Learning Framework, Centre for Teaching Excellence Blog, University of Waterloo https://cte-blog.uwaterloo.ca/?p=5282

Chapter 6. Shine the Light: Using the ICE Framework in Sociology Courses to See the "Big Picture"

6.1 Instructional Context

Mavis Morton – University of Guelph

Have you ever had students struggle with why they are being asked to engage in class activities and assessments? I certainly have! To address this, I use the ICE framework to help students take a step back and get a closer look at the purpose of the course, providing a clearer picture of the reasons that students are being asked to engage with activities and assessments in the first place. More broadly in my teaching across all student levels, I apply ICE in two ways: (1) as a conceptual framework to help make visible the connection between course learning outcomes, teaching and learning activities, and assessment, and, (2) in combination with other pedagogical approaches that help students learn how to critically and accurately read, communicate, and apply academic literature to real-world social problems.

I first heard about the ICE framework in 2014 from my sociology colleague who was introduced to it by one of the educational developers at our institution's teaching and learning centre. I appreciate the adaptability of ICE and I use it in all the courses I teach. Currently, I use the ICE framework in fourth-year sociology seminar courses as well as in first-year level and graduate-level courses that are open to students from departments outside of sociology. The fourth-year sociology courses are upper-year elective courses that help to fulfill the requirements toward a major in Sociology and/or a joint Criminal Justice and Public Policy (CJPP) honours

program. These courses are capped at 30 students; the courses are always full and usually have a waiting list. They offer upper-year students a seminar-style experience that they may not have had until they reach their senior year. The seminars examine contemporary topics related to the specific course and include three hours in class each week with high participation expectations in addition to pre-work that includes reading academic journal articles before each class, as well as individual and group work in and outside of class that are associated with assignments. The following discussion is based on my experience using the ICE framework with these fourth-year sociology courses.

6.2 Discussion

Despite articulated course-level learning outcomes (LOs) in the course syllabi, the connection between course LOs, teaching and learning activities, and assessment—or what is commonly referred to as Constructive Alignment (Biggs 1996; Fink 2003) or the Course Design Model (Ellis 2007) (Figure 1 below)—is often not explicitly understood and students may not appreciate why they are being asked to participate in certain activities and/or why or how they are being assessed and as a result how they might improve.
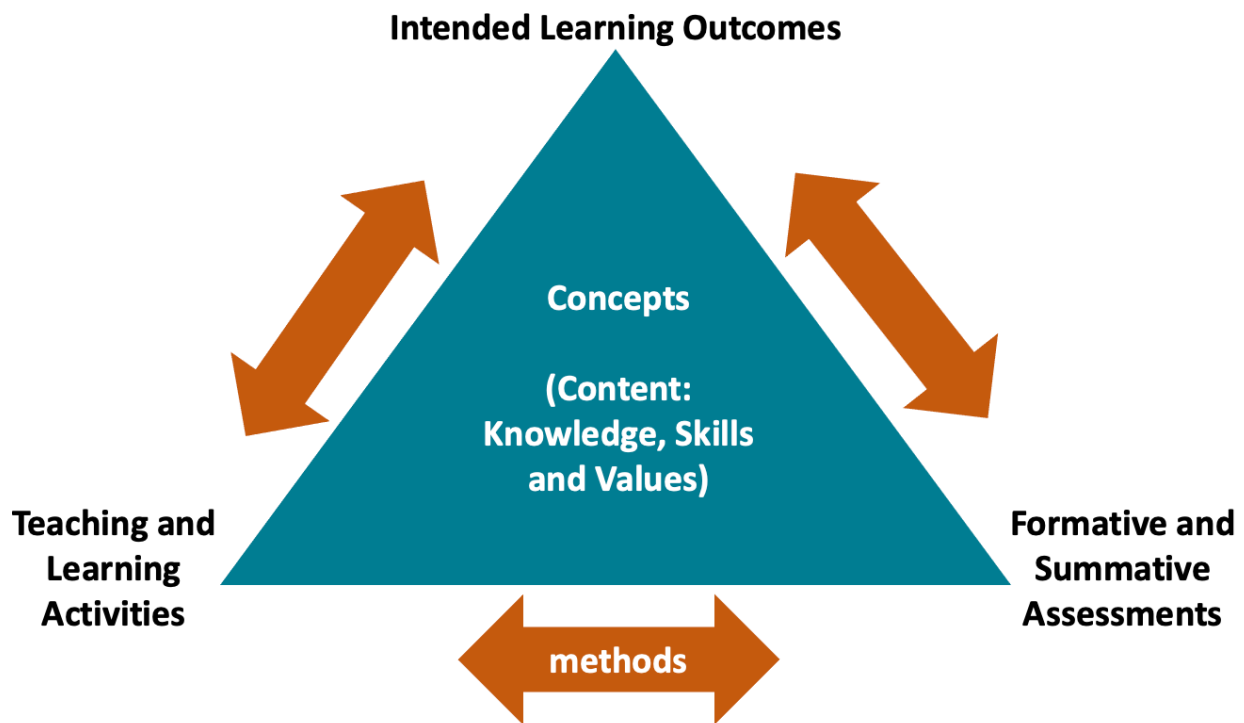
Figure 1: Course Design Model and Constructive Alignment, adopted from Aligning learning outcomes, assessment, and teaching methods in Ellis, D. (2007). Teaching Excellence Academy workshop. University of Waterloo, Canada.

As an instructor, I was looking for a way to increase the visibility of this alignment for students. The ICE framework offers this visibility. The ICE Rubric (Figure 2 below) illustrates for students some of the connections between course learning outcomes (e.g., Communication and Critical Thinking) and how these skills will be practiced

and assessed in this course. The ICE rubric helps students to recognize that they will be asked to demonstrate foundational communication skills, such as (a) being able to locate an author's argument from a particular academic article (i.e., an Idea), (b) more advanced skills (e.g., Critical Thinking), such as finding examples of the relationship among academic articles on a similar topic (i.e,. a Connection), and (c) being able to apply or extrapolate content from one or more of our course readings paper(s) to other contemporary events (i.e. an Extension).

Element	Ideas	Connections	Extensions
Content Learning Outcomes: • Communication (C) • Critical Thinking (CT)	• Accurately identifies the purpose of the paper and/or the author's argument and/or author's research questions (C) • Accurately identifies the paper's theoretical perspective (C) • Accurately identifies the paper's methodological approach (C) • Accurately identifies the paper's findings/ conclusions (C)	• Draws attention to/analyze the relationship among articles on a similar topic (i.e. author's arguments, theoretical perspective, methodology, findings, etc.) (C & CT) • Draws attention to/analyze the relationship among articles between different weekly topics (i.e. author's arguments, theoretical perspective, methodology, findings, etc.) (C & CT) • Draws attention to connections between course articles and sociological concepts/perspectives/levels of analyses (C & CT)	• Extrapolates relevant content from the paper(s) to other current events/situations. (C) • Extrapolates relevant content from the paper(s) to mainstream media representations of a similar topic or social problem (C & CT. • Evaluates relevant content from the paper(s) to other course topics/social problems (C & CT)

Figure 2. ICE Rubric to Measure Communication and Critical Thinking Skills

I use the ICE framework (Figure 1 above) in combination with the Academic Reading Review Table (Figure 3 below). The reading review table helps develop students' ability to carefully read and document the specific kind of Ideas to which the course learning outcomes refer.

Author/ Citation	Purpose Statement Research Qs	Background Theory	Methodology Methods	Results Findings Conclusion	Other e.g. Tensions Debates Limitations

Figure 3: A sample of an Academic Reading Review Table

ICE as a Conceptual Framework

To make the "big picture" of the course more visible, I include the ICE language explicitly in the course learning outcomes associated with "Communication" and "Critical Thinking".

> Communication: Communicate a sociological imagination via ideas, connections, and extensions (ICE) effectively orally and in writing.

> Critical Thinking: Analyze the connection between the way women as victims, offenders, and professionals are defined, measured, theorized, represented, and responded to by media, research, policy, and the criminal justice system.

I modelled the development from Ideas to Connections to Extensions through a think-aloud process that encouraged students to take notice of the qualities and characteristics of each frame of learning. Based on my own experience and observations of intentionally using ICE as part of the design of the course and based on solicited student feedback and reflection, I found that using the ICE framework

increased student engagement and participation, especially in discussions and classroom activities. Let's take a closer look at some examples from my Violence and Society course to illustrate how I use ICE as a conceptual framework, a formative teaching, and learning activity, and as summative assessment.

ICE as Formative Activity: Reading an Academic Article

One of the primary teaching and learning activities used in the course is working on how to carefully read an academic article. Individually and weekly my students use the ICE framework as a way to practice close and critical reading of academic literature by (a) identifying the essential Ideas from individual academic journal articles, and (b) exploring Connections across multiple forms of literature.

As a post-secondary educator, despite some of the challenges of time and process, formative assessments are a feature of my pedagogical approach that I find have value and helps students move forward (Chanpet, Chomsuwan & Murphy 2020) in developing the knowledge and skills that will be more formally assessed in the future. In order to help students grasp what is expected when they read these academic articles, I use the Academic Reading Review Chart (Figure 4 below)[1] as discussed above to help ensure students identify the most important content (Ideas) from each article. As a formative activity, I ask students to form small groups in class and talk about the Ideas they extracted from this article and from the other articles that were assigned for that week. After the small group discussion, we turn this into a large group activity and I ask for volunteers to identify the Ideas by marking the letter I in their readings and identifying Connections by marking the letter C. We go through each column of the chart to provide students with practice, in a low-stakes environment, identifying the Ideas component of the ICE framework. Once the relevant Ideas have been identified, we use the same process for identifying Connections across multiple articles for each week of readings.

1. . Figure 4 is a completed chart and is an actual example of the kind of Ideas that students would be expected to extract from one of the actual articles used in the Violence and Society class on the topic of Gendered Violence.

Author/ Citation	Purpose Statement Research Qs	Background Theory	Methodology Methods	Results Findings Conclusion	Other e.g. Tensions Debates Limitations
Naugler, Diane, 2017. Making Violence Remarkable: Reconsiderations of Everyday Gender Violences, Chapter 2 *Mapping Geographies of Violence*. Eds. Kitchin Dahringer, H.A. & Brittain, J.J. Fernwood Publishing, Halifax	The gendered organization of violence is part of a socially constructed set of values through which we recognize ourselves, and each other.	Poststructuralism	Literature review and media case analysis	Violence is a set of ideas and strategies that get put into practice in society in contextual and value-specific ways, for example, in operationalizing gender. Our meanings about gender define and limit who and how we can be violent	

Figure 4: A completed sample of the Academic Reading Review Table

ICE as Summative Assessment: Critical Media Assignment

Connected to the teaching and learning activity above, I use the ICE framework to inform the design of assessments to grade students' individual and group work on their ability to communicate and think critically (and sociologically). One of the assignments used to practice Ideas, Connections, and Extensions is called a Critical Media & Topic Analysis (Figure 5 below for a brief overview of the assignment). Students sign up for one of the optional topics they are interested in and self-select into small peer groups. Students are assigned academic articles that report on the way violence is typically depicted in the news. Asking students to reflect on the way that sexual violence for example is depicted in a newspaper article is a great way for students to demonstrate critical thinking.

Assignment/Assessment	Grade Breakdown
Critical Media & Topic Analysis (4-5 per group) • Pick a topic/week and find and agree on one relevant media source/event (within the last 5 years) related to the topic • Identify ICE between the academic media literature and your media example in your written and oral analysis/presentation • Oral group presentation of your collaborative analyses in class (within 20 mins) with a PowerPoint presentation and intentional teaching and learning activities to increase class participation, engagement & learning	**25%** total • **5%** individual grade for outline submitted one week prior to presentation • **10%** individual grade for written analysis submitted one week after group presentation • **10%** group grade for knowledge mobilization presentation

Figure 5. Critical Media & Topic Analysis Assignment Overview

Once the student groups are formed, students collectively choose a current mainstream media source (e.g., a newspaper article, TV show, documentary, song, etc.) that portrays their topic. As identified in Figure 5, there are three parts to this assignment: (a) an individual one-page proposal, (b) an oral small group presentation and, (c) an individual short written analysis. All parts of the assignment ask students to provide specific evidence in answering the following questions:

To what extent does the media source (e.g. newspaper's depiction of sexual violence) affirm or contradict the:

1. research on sexual violence from the academic articles?
2. research on the way media typically portrays sexual violence?

In answering these two questions, students must demonstrate their ability to find and provide evidence for relevant Ideas, Connections, and Extensions. As outlined

above as a formative activity, students must start this assignment by identifying the Ideas from each of the topics (e.g., sexual violence) and media research articles on portrayals of sexual violence. In other words, students need to have read all of the assigned academic articles and understood these specific Ideas from each article:

1. the purpose of the article and/or the research questions that guided the study.
2. the theoretical perspective used in the paper
3. the methodology/methods used (i.e., a literature review or if the article reports on a study, how was the data collected/analyzed,
4. the findings/conclusions of the author and
5. any tensions/debates identified in the literature by the author

Once the Ideas of each paper have been addressed, then students are asked to identify the Connections across the academic articles on sexual violence and the Connections across the media research articles on sexual violence. During this phase, and in keeping with the course learning outcomes, students draw attention to and analyze Connections at the content level and articulate the relationship between or among the papers' findings/conclusions (for example are they aligned or not?). Students consider whether there are Connections to be made across the academic articles on sexual violence and across the media research on sexual violence. Finally, students are asked to demonstrate their Extension skills by (a) taking the Ideas and the Connections from both sets of literature, and (b) evaluating whether they see any of these Ideas and Connections showing up in the way the current newspaper clip they chose portrays the issue. The purpose of the assignment is to think about whether the causes of an issue like sexual violence are explained in a similar or different manner compared to how it is depicted in mainstream news (like a newspaper).

In class, I provide a couple of examples for each stage of the ICE framework. As an Extensions example, I played an episode of *Full Frontal with Samantha Bee,* which is an American TV late-night talk show and news satire program. In this episode titled #MeToo Backlash Samantha Bee discusses sexual harassment and the #MeToo movement. Before showing the clip I ask students to watch the clip and try to find evidence of the way in which sexual violence is explained and theorized. After the clip is played, I project the following slide as an example of a relevant and

appropriate Extension for the purpose of the media assignment and in keeping with the Communication and Critical Thinking course LOs.

Example of an Extension (ICE)

Theorizes the relationship between gender and violence (there is one!)

There is need to explicitly address the less than full overlap of the violence that is variously 'domestic', 'gender-based', and 'against women'. This includes consideration of violence that is gendered but not domestic.
(Walby, Towers & Francis, 2014, 188).

"Over the past few months, we have all discovered who is behind workplace harassment and it's literally thousands of men."
-Samantha Bee from Full Frontal

"...role violence (sexual harassment) plays in the production of normative gender"
(Naugler, 2017, 29)

Figure 6: Example of an Extension in the ICE model exploring messages across different forms of media

Specifically, the slide is intended to show that a sociological explanation for sexual violence is offered from both the academic research (in this case Nagler 2017 and Walby, Towers & Francis 2014) and Samantha Bee's commentary. In this example, there is a Connection between Samantha Bee's explanation of sexual violence and the theoretical perspective of the academic articles on gendered violence. In some cases, the explanation between the media source and the academic literature on a topic may not be similar, and if this is the case, students would be expected to notice and articulate the lack of Connection or the dissimilar theoretical perspectives offered. Either way, the same set of cognitive skills are being assessed.

6.3 Impact

Impact on Student Learning

Since introducing ICE as a conceptual framework in all of my courses over five years ago, I have noticed that students are generally more prepared, engaged, and motivated and therefore seem more able and inclined to participate in class. Students have used office hours to meet with me to get feedback on their ability to use the ICE framework via the Academic Reading Chart. During these meetings, students often express how useful and easy the ICE framework is for them to use and it reminds them of what they are to be working on and why. Their orientation towards understanding the reason behind the activity leads to deeper levels of analysis in class discussions about the readings and the connection to real social problems. With clearer expectations and concrete teaching and learning activities in the form of pre-work (such as the Academic Reading Review Chart and ICE rubric) and in class activities, students appear to be increasingly prepared to more accurately identify the essential Ideas and therefore are more able to build on that information to explore and evaluate possible Connections and Extensions.

"One of the reasons I appreciate the use of ICE is because it provides structure for thought [and] helps students get in the habit of higher-order thinking in their everyday lives."

—Student Feedback from CCJE

The ICE framework seems to increase students' academic confidence across a variety of contexts. As one student explained, "The ICE framework was not only applicable to the course that Professor Morton taught, but applied to other courses such as psychology, politics, and even an elective (Italian). My understanding of course content improved along with my grades. The framework is one I will continue to use through next semester and even in graduate studies." Applying

each phase of the framework students took ownership by articulating and reflecting on their learning process.[1]

Impact on My Teaching Practice

Using the ICE framework has changed my own teaching and learning practice. It has encouraged me to be more intentional and explicit about what the course will focus on and what students will be expected to know, do, and value. More specifically, using ICE has helped me to more clearly articulate the expectations I have of my students in the context of their class participation, class discussions, and assignments. In addition to ICE being an easy way to help students recognize how to practice higher-order thinking and metacognition, it has helped me identify and distinguish the development of students' skills and therefore how to assess them. By integrating the ICE framework as a learning outcome, and as an approach in activities and assessment, I can more readily recognize when students have arrived developmentally and therefore when and where they need support (or not) in order to increase their capacities and confidence.

1. The student feedback was solicited by the author after the courses ended and final grades were submitted. Students had the option to offer feedback on their experience of using ICE and student permission was given to use their feedback here.

6.4 Conclusions and Caveats

Using the ICE framework has the potential to raise students' consciousness about various aspects of their learning experience as they themselves systematically engage in individual and group think-aloud processes of identifying, assessing, and communicating their Ideas, Connections, and Extensions. With an increased understanding and visibility of the course learning outcomes, students can become more invested in the purpose-driven, ICE-specific teaching and learning activities and assessment as they practice the intended learning outcomes. In my experience and based on the feedback I have received from students who have used the ICE framework, it enables them to take more ownership for their learning and successfully demonstrate the knowledge, skills, and values they have and have gained throughout the course.

As mentioned previously, I use the ICE framework in all the courses I teach, and although I use it somewhat differently depending on the level and course learning outcomes, it nevertheless has application beyond what this chapter offers.

Writing this chapter has given me the opportunity to reflect on the ICE framework in a way I have not previously done. I think that the critical feature of the ICE model is its conceptual power that has the potential to make visible—for students and instructors—the big picture and its ability to build student agency, reflexivity, as well as critical capacities. This conceptual power is particularly appealing given sociology's interest and enthusiasm for big picture thinking about our world. Until I started writing this chapter and having conversations with other chapter authors and the editors of this book, I did not recognize all of the ways that I use ICE (as a conceptual framework, teaching and learning activity, and assessment) nor how embedded it has become in my teaching and learning practices. As such, this process has had an illuminating effect for me as well as my students, allowing me to more clearly recognize how and why the ICE framework appealed to me in the first place. It offers the kind of big picture framing that I value as a sociologist and promulgate as a professor of sociology.

References

Bee, S. Full Frontal #MeToo Backlash | January 17, 2018 Act 1 | Full Frontal on TBS https://www.youtube.com/watch?v=II-OP6vdMs8

Biggs, J. (1996). Enhancing teaching through constructive alignment. Higher Education, 32(3), 347-364. doi:10.1007/BF00138871.

Chanpet, P., Chomsuwan, K. & Murphy, E. (2020). Online Project-Based Learning and Formative Assessment. Technology, Knowledge and Learning, 25(3), pp.685–705.

Fink, L. D. (2013). Creating Significant Learning Outcomes: An Integrated Approach to Designing College Courses. San Francisco, CA: Jossey-Bass.

Ellis, D. (2007). Teaching Excellence Academic Workshop. University of Waterloo. Canada.

Nagler, R. (2017). Measurement of Media Exposure. The International Encyclopedia of Communication Research Methods.

Walby, S., Towers, J., & Francis, B. (2014). Mainstreaming Domestic and Gender-Based Violence into Sociology and the Criminology of Violence.

Chapter 7. ICE in an Advanced Legal Research Course

7.1 Instructional Context

Christa Bracci – Queen's University

The ICE framework was a useful tool in my Advanced Legal Research course, both for assessment and as a way of encouraging upper-year law students to think about their own learning. In order to keep up with rapid changes in the law and in the legal practice environment, early-career lawyers need to learn quickly and purposefully, integrating new knowledge rapidly and applying it to novel contexts. To help students become more self-regulated learners, I introduced the ICE framework on the first day of the course and gave them regular opportunities to apply it in formative exercises as well as in two summative assessments. Students used the framework as a way to characterize and identify gaps in their learning, and describe the progression of their skills acquisition in legal research. As an instructor, the framework helped me to be more transparent in expressing my expectations around student performance. Going forward, it is a portable tool that students could use in support of learning across contexts, both in law school as well as in legal practice.

The ICE framework first came to my attention in late 2017, when I was revising my course materials for Advanced Legal Research (ALR), an elective, full-credit course for upper-year law students. More than eight years had passed since I had last taught the course. In consulting course texts and articles on teaching and learning in this area, two important considerations became apparent.

First, before I first taught legal research, some scholars had argued for a shift in legal research pedagogy, away from the so-called "bibliographic approach" and toward

a more process-oriented model, based on active problem-solving (Berring, 2008).[1] Rather than simply identifying resources, students needed to understand how these resources were created, how they were related, and how to choose resources that were a good match for the type of legal problem that needed to be addressed, in order to create effective strategies for information location and retrieval. The literature suggested that process-based pedagogy had taken hold(Kaplan & Darvil, 2008; Davis et al., 2013; Calister, 2012).

Second, the range of research tools and resources for legal research, and the main points of access, had changed dramatically. With the shift to process-based instruction came a concurrent shift to electronic-based (rather than print-based) legal research. But the sheer volume of legal information available online was enormous. Tools and databases were proliferating. Students would need to deal with the same, if not an accelerated, rate of growth and change in online information during their early career, and they would need the skills to manage the volume, continually and quickly learn what emerging tools or resources were able to offer, and successfully select the right resources for a given research problem. In other words, in order to keep up with online legal research in a practice environment, students would need to be able to identify gaps in their skill sets, address those gaps quickly and efficiently, and do so in the midst of a busy practice.

It was important that the ALR course respond to these realities. Law students see mastery of legal research as key to their success. Students in all roles – summer interns at law firms, articling students – as well as early-years associates will spend a large portion of their day seeking relevant legal and non-legal information in support of ongoing client matters. What's more, such research often occurs at the cutting edge of the law's development. To stand out, it is not enough to be merely competent; students want to build a skill set that will set them apart from their peers.

---

1. The shift was fueled, at least in part, by lawyer dissatisfaction with the research skills of students and new associates. The bibliographic approach focused on describing the nature of library resources; students would learn to identify various resources, their purposes, and their access point, both in the library's physical collection and eventually, online. Assessment would usually consist of a library scavenger hunt and a final exam that tested the ability to recall specific information. Scholars argued that, in light of the proliferation of resources and tools, students needed more robust preparation for effective legal research in support of legal problem-solving. The particular model was called the process approach.

Change is a constant in the practice of law, and since constant learning is required, law students benefit from becoming more expert, more self-regulated learners (Schwarts, 2003; Calister 2014; Santangelo & Gundlach 2019). Professor Elizabeth Bloom (2017) of Northeastern University School of Law notes,

> Educational psychology research instructs us that the best way to create successful law students and lawyers is to teach our students to become self-regulated learners. Self-regulated learners take responsibility for their own learning by using metacognition .... This entails approaching each learning task by first identifying the precise learning goal, then developing strategies for engaging in and monitoring understanding until the task is successfully completed.

Indeed, a law student's success depends greatly on their ability to constantly, relentlessly, level-up their knowledge base and skill-set(Callister, 2012). Yet law students often fail to see that learning how to learn is, itself, an essential skill when you work in a rapidly changing environment. [2]

The ICE framework held potential for introducing students to elements of metacognitive awareness in the legal research classroom. It provided a conceptual vocabulary that students could use to talk about and reflect on their own learning. It also gave me a way of articulating my expectations around student performance more clearly, in both learning outcomes and in assessments.

2. Bloom goes on to note that a "recent empirical study demonstrated that the metacognitive skills of highly qualified newly admitted law students were weak". In the jurisdiction where Bloom is writing, students graduate from law school and are admitted to the bar very soon after. In Canada, an intervening period of apprenticeship, or "articles" occurs between graduation from law school and call to the bar – a period of up to twelve months, in some provinces.

7.2 Discussion

Student Use of the ICE Framework

On the first day of the course, I introduced the ICE framework to students. I described the origin of the framework and its purpose as a means of guiding learning and assessment. I also suggested that students themselves could use the terms and framework as a vocabulary to describe their own learning process throughout the course. I explained that the various ICE verbs, displayed in a chart on a slide, were useful for differentiating between the capabilities represented in each frame of the model.

To illustrate the progressive and expansive aspect of the frames, I presented three sample questions on a concept with which students were already familiar.[1] Each question was designed to invite responses squarely within one of the three ICE frames. The Ideas frame question focused on information recall regarding a single research tool; the Connections frame question invited students to compare and contrast what they knew about two related research tools, and the Extensions-framed question prompted students to adapt what they knew to a novel circumstance. We discussed each question and the difference in the quality of the answer that would satisfy it.

I also suggested to students that the frames and their progression should seem familiar, as they corresponded to the typical markers of achievement on law school exams. Law students often are told by their instructors that, to do well on a law exam, you must not only be able to identify the relevant legal rule in a case or statute (Ideas); and compare/connect the rule(s) to other cases in which the rule has been developed or interpreted (Connections); you must also be able to apply

---

1. The questions were as follows: Information frame, "Describe the purpose and organization of the Canadian Abridgment Case Digests (CanAbCD) database." Connections frame, "Compare the function of the CanAbCD classifications to the CED subject headings." Extensions frame, "Assess the utility of the CanAb CD classifications in researching an un- or under-developed area of law, such as the Ontario rules governing crowd-sourced online charitable appeals (GoFundMe or similar)."

that rule to analyze a new set of factual circumstances and predict outcomes (Extensions).

Students readily adopted the model as a way of describing and monitoring their own performance and as a way of exploring what a task asked of them (see Impact, below). We used the framework collectively to describe their developing knowledge base and skill set.[2]

Instructor Use of the ICE Framework

Class discussion

I referred to the framework often in class discussions, to model for students how they might use it to analyze learning tasks. For example, as a class, we noted that understanding and recalling the steps in the legal research process, or a list of search techniques, or the attributes of particular research resources, were tasks that primarily engaged the Ideas frame. Doing this reminded students that they could observe and classify their own achievements in learning. It also gave me a way of prompting them to stretch their thinking into a more complex frame: "Here, I'm simply referring to the attributes of x; but how do the characteristics of x distinguish it from y?" Such comments were intended to anchor students in the ICE framework and explicitly highlight the difference between simple information recall (Ideas frame learning) and active, purposeful comparison of elements in their knowledge base (making Connections).

This approach worked similarly well our class discussions focused on information-seeking skills (the application of particular techniques for information seeking; know-how, as opposed to know-what). Students seemed able to recognize that

---

2. In the Ideas frame, "I can recall relevant research concepts; I can recite the steps in a research process"; in the Connections frame, "I can articulate the relationship between resources, tools or techniques", "I can compare/ contrast how these tools could be used, together or separately; and in the Extensions frame: "I can predict what situations would warrant the use of a particular resource, tool or technique; "Using what I know about these tools and techniques and their functions, I can design an effective strategy for information-seeking in support of legal problem-solving."

identifying the elements of a skill (for example, the steps in executing a particular online search technique) was qualitatively different from being able to compare and assess one technique as against another, and then predict which technique would be most useful for a particular research task.

Two or three times during the course, I returned to the strategy I used in the first class. I displayed a slide at the end of class with three questions related to the concepts of the day, one based on each of the ICE frames, using the related ICE verbs. Of course, students were easily able to identify the frame of learning for each question. Then we worked through the questions, as a review of that day's material, but also as a way to connect new information back to earlier concepts and forward (extend) into hypothetical research tasks.

A Bonus Exercise and Two Assessments

As an offshoot of the "three questions" slide, I invited students to submit an optional exercise to earn a bonus point on their final quiz. Students were asked to create three questions, one for each frame, using ICE verbs, on a course concept of their choice.[3] They also needed to include a model response for each question. Almost half of the students in the course took advantage of this opportunity. I offered feedback on their characterization of questions as belonging in one frame or another, and on their selection of ICE verbs. For my own purposes, I also paid special attention to their Extensions questions, as a way of gauging the impact of the exercise, because in order to construct a good Extensions question, students would have to be able to predict, to some degree, how their future experience as practitioners might make demands on their research skill set.

The "three questions" theme returned again on the final quiz. Each of the 20 questions on the quiz was explicitly classified in accordance with the type of answer it invited. Questions that asked a student merely to demonstrate their recall of concepts were labelled as "I" questions and were worth 4 points each. Questions with a "C" label were worth 6 points and asked students to compare and contrast

---

3. I received submissions on a wide range of course topics, such as the federal legislative process, authoritative secondary sources, techniques for searching non-traditional secondary sources, legal research checklists, electronic case law research, journal databases, and subject-based versus keyword-based search techniques, to name a few.

various research resources, tools, and techniques. Finally, an "E" question signalled that students were being asked to apply their knowledge to new circumstances or to design a strategy or predict a combination of tools and resources that would be helpful in a particular situation.

The other major assessment, a course paper, was also loosely connected to ICE. In this paper, students were required to construct and communicate an efficient research strategy for a topic of their choice. I advised students that this was primarily an exercise in Extensions, pushing their developing legal research skill set to describe a comprehensive approach to researching their chosen topic area. I explained that it would not be sufficient to merely recite the steps in legal research, nor to describe a tool or technique, or even to compare basic functionalities. To be successful in the assignment, students would have to show their ability to combine and apply research tools and techniques to design an effective, efficient research strategy for a specific topic area, justify their overall approach as the optimal one, and communicate it to others.[4]

---

4. Rubric criteria for high achievement in Overall Effectiveness read: "The research strategy is fully customized to the needs of the specific topic. The student anticipates and articulates how the strategy may be adjusted in relation to the passage of time and the ongoing development of the law in the topic area. Creativity and innovation are apparent and the student is able to fully justify each element of the proposed strategy."

7.3 Impact

Observations made during and after the course suggest possible impacts of the ICE framework. But it is important to acknowledge here that the approaches described above depart substantially from the more established modes of use for the ICE model. Those familiar with the model will note that I have flagrantly bent it away from a key piece of advice offered by the ICE authors in their first book: questions for assessment should be answerable by all students and extendable by some. Particularly on the quiz, by specifying the type of response I was trying to elicit, I created a situation whereby students who could go further were not required to; this approach masked any differences between students who could extend and those who could not on the Ideas-framed questions. However, as noted, the skill set in legal research, and in particular legal reasoning,[1] is readily divisible into the frames of the ICE model, albeit in sequence as opposed to concentric rings or frames. This almost certainly influenced my approach.

Students readily adopted ICE vocabulary as a way of talking about learning. The model is portable and straightforward, which seemed to contribute to their willingness to use it both in and outside of the classroom. They used it without any additional instruction beyond the day one slides, and there were instances of students using it spontaneously. For example, students framed in-class and email questions with the framework in mind: "Can you clarify *x* for me? I think I need a better grip on this concept before I can make connections…" or "I understand the concept of *y*, but I'm having trouble extending it to other contexts aside from what we discussed in class."

More than half of the students completed the "Three Questions" bonus point exercise. This was good uptake, given the time of term at which this was offered. Both their questions and their (typically extensive and thoughtful) model answers suggested they were making a sincere effort to use the framework, as opposed to merely going through the motions for the bonus point.

---

1. Recall and state the legal rule; interpret the rule, or connect the rule as articulated in one case to its articulation in a series of cases (legal synthesis), and apply the rule to a new fact situation to predict an outcome.

On the quiz, it appeared that students had adjusted their quiz-taking strategy to account for the fact that questions were classified by frame[2] Many students answered all the *Ideas* questions first – probably because they understood these to be the easier questions to answer, especially since the quiz was open-book and "I" frame answers would have been easily extracted from students' notes or the course text. Most saved the two *Extensions* questions for last.

Many students also appeared to limit the time they spent on *Ideas* questions, saving time to work on the higher-point questions. This was evident from the fact that in some cases, not all *Ideas* questions were answered, but there were at least attempts to answer all *Connections* and *Extensions* questions. This was, no doubt, due at least in part to an attempt to maximize earned points. Nevertheless, in some cases, even when answering an *Ideas*-type question, students went to some effort to show that they could not only identify or describe a concept but that they also could connect it to another related concept, even though they knew that no extra points were awarded for this.

As an instructor, I found the ICE framework especially useful in two ways. First, it helped me refine my articulation of learning outcomes. I was able to see that some of the course learning outcomes contemplated achievement at the *Ideas*-level; and that this was in fact sufficient. Not all outcomes needed to be expressed in the *Extensions* frame. This in turn helped me be more transparent in communicating learning expectations to students and in justifying my expectation of higher-level performance on some tasks. Second, the framework provided a thematic thread that could be woven throughout the course. By referring to the framework at various points in time and in various contexts, I encouraged students to recall comments made on the first day of class regarding metacognitive awareness and self-directed learning. This was also a way of modelling for students how they could use ICE themselves as part of a regular reflective "check-in" with their own learning.

---

2. I recognized this from the order in which a student's written answers appeared in their quiz submission. On the quiz paper, the three types of questions were mixed randomly, but there was no requirement that students had to answer the questions in order. As a result, I noticed that in many answer booklets, all the I questions appeared together and had been answered first, etc. Students appeared to allot their time according to question type.

7.4 Conclusions and Caveats

The ICE model is portable and flexible and can be adapted to a variety of applications within a single course. It is easy to explain. Students can use it effectively after only a brief introduction. And it works well for encouraging students to pay attention to their learning process, which is a necessary step in becoming a self-regulated learner. Without follow-up surveys, it's difficult to say whether students have continued to incorporate this model as a tool for reflecting on their own learning and tracking their development as early-career lawyers. Nevertheless, within the context of the course, the ICE framework proved to be easy to use and readily accepted by students as a way of talking about their learning. To me, this seems like a good step toward helping students become more self-aware, self-directed learners and helping them build and rebuild a robust legal research skillset for use during and beyond law school.

References

Bloom, E. (2017). Creating Desirable Difficulties: Strategies for Reshaping Teaching and Learning in the Law School Classroom. *University of Detroit Mercy Law Review, 115,* 117

Callister, P. (2012). Time to Blossom: An Inquiry into Bloom's Taxonomy as a Hierarchy and Means for Teaching Legal Research Skills. *Law Library Journal, 102*(2), 191.

Callister, P. (2014). The Metacognitive Imperative. *The Boulder Statements on Legal Research Education: The Intersection of Intellectual and Practical Skills, 25.*

Davis, L. (2013). Teaching Advanced Legal Research in a Flipped Classroom. *Perspectives: Teaching Legal Research and Writing, 22*(1), 13

Santangelo, J. and Gundland, J. (2019). Teaching and Assessing Metacognition in Law School. *Journal of Legal Education* <https://papers.ssrn.com/abstract=3371946>

Schwartz, M. (2003). Teaching Law Students to be Self-Regulated Learners. *Law Review, 447*.

Chapter 8. Patient Mentorship in Occupational Therapy Education: The Influence of ICE on Student Learning

8.1 Instructional Context

Anne O'Riordan – Queen's University

Students in the healthcare profession of occupational therapy are expected to work within a client-centred philosophy, meaning in collaboration with their clients (a term used here interchangeably with patients). While this partnership is intended to ensure client engagement in rehabilitation goals and plans, leading to compassionate, efficient, quality care, students' education and opportunity for application of this philosophy are often lacking. At Queen's University, developing an understanding and appreciation of the lived experience of clients as they navigate within their respective environments, within relationships, social structures, and the built environment, underpins the development of the healthcare relationship. For 18 years, I coordinated this distinctive learning opportunity through a course called The Lived Experience of Disability. Rather than learn about disability from guest lectures and textbooks, students venture into the community, under the personalized mentorship of an individual whose expertise includes the experience of chronic illness or disability. Learning through mentor visits is supplemented by facilitated tutorial discussions, first-person resource reviews, and reflective journal writing. In this chapter, I offer an authentic case study from the course, including the customized Ideas, Connections, and Extensions rubric, to share an example of using ICE to enhance, challenge, and evaluate my

students' learning. ICE was chosen for its ability to dovetail with the rubric I had initially adopted for the course which included the required content areas for evaluation and feedback. By overlaying ICE onto the original rubric, I was able to create a hybrid rubric to describe a student's performance more precisely, highlighting their strengths as well as areas in which they could challenge themselves further to yield insights of greater depth.

In 1999, I was invited by the faculty of the Occupational Therapy Program to develop, coordinate, and teach a pilot fieldwork activity for first-year students called the Community Partnership Project. At that time, the program admitted 25 students to this Bachelor of Science degree program each year. To support the profession's underlying value of client engagement and partnership, the program reviewed its methods of teaching this key element and supported the premise that individuals with lived experience must be part of the process. While this inclusive approach would no doubt be considered common sense today, it was a relatively novel idea two decades ago. The fieldwork activity that I designed with other faculty members involved matching pairs of students with a community mentor—a person with lived experience of chronic health conditions. Through a series of community visits with their mentor, students had the opportunity to observe and reflect on living life with a disability in real-world contexts and engage in a relationship that welcomed questions and curiosity beyond what could be expected or acceptable in their professional relationships with clients in future. I quickly realized, after struggling through the first iteration of the project, that engaging mentors in the course planning would significantly enhance the quality of the course and its effectiveness. An Advisory Committee was created in 2000 with three mentors, all of whom had long-term lived experience of chronic health conditions along with a keen motivation for educating students. They worked alongside me in all aspects of the course including curriculum development, review, documentation, and knowledge dissemination. In so doing, I modeled the client-therapist partnership within an academic context. This was a key step in creating a unique and authentic learning experience for students.

The original rubric chosen for the course, based on *The Art of Focused Conversation* (R. Brian Stanfield) provided guidance for students as they captured their learning related to Objective, Reactive, Interpretive, and Decisional elements (ORID) of the experience in reflective journal assignments. When the Occupational Therapy Program transitioned to a master's degree in 2004, the project was developed into

a credit fieldwork course called The Lived Experience of Disability (course code OT825) within the new curriculum. It was at this point that I recognized the need to incorporate a more rigorous evaluation of student learning for the program's 72 first-year students, for both the journal assignments and tutorial discussions. I attended a workshop on the ICE Model of Assessment facilitated by Sue Fostaty Young. What a timely professional development opportunity for me! I realized that ICE could improve the existing evaluation framework by adding depth to its content while maintaining a flexible, reflective, feedback-focused approach. It felt as though ICE was the missing piece of the assessment pie – one that would provide students with detailed and clear feedback while pointing the way to deeper learning opportunities. I could envision improving the evaluation process by providing examples of where the students were currently performing in their reflections and learning continuum while nudging them toward more meaningful and relevant insights.

8.2 Discussion

Key components of the course included: mentor visits; tutorial discussions; journal writing and reflection; required readings and resource reviews. Mentors themselves provided feedback to students about their performance, specifically relating to communication skills and professional interactions during community visits, with their summaries documented in the students' final evaluations. As an instructor, it was my responsibility to determine the students' ability to synthesize the various components of the course and demonstrate their learning. This was done through their reflective journal entries and tutorial participation. A workshop during the course orientation class, facilitated by experts in the field of reflective practice, provided definitions, guidelines, and examples of reflective journal entries along with in-class practice exercises. I reviewed the students' journal submissions at the mid-point of the course to provide formative feedback and again at the conclusion of the course for summative feedback for this pass/fail course. In both reviews, the ICE/ORID rubric was used to evaluate and provide constructive feedback, both narrative and visual, for the students. This allowed students to see their current performance along with areas of strength and weakness so they could plan for improved efforts in targeted areas. The beauty of using the ICE/ORID rubric was in its simplicity as a visual feedback tool as well as its capacity to stimulate detailed comments from the instructor. To me, it was apparent that the ICE model transformed the content areas of assessment into multi-dimensional feedback. This was an exciting revelation for me and led to a significant improvement in the feedback I was able to provide to students. The case study of one patient mentor and the student with whom he was matched, along with the customized assessment rubric for the course, are found at the conclusion of this chapter.

Using ICE as part of the assessment framework for the course was not the only benefit, as I also reviewed the rubric when planning tutorial agendas and discussion topics. My approach to tutorials was to collaborate with students in the initial meeting in the development of ground rules so that we agreed about how our discussions would unfold, ensuring student engagement and active participation. The ICE model broadened and deepened the quality of the discussions. For example, the issue of student H's dilemma about offering assistance to his mentor

at a grocery store became an hour-long discussion addressing topics of 'helping etiquette', socially acceptable language, *us* vs *them* bias, community accessibility, and funding discrepancies. The discussion continued and broadened in subsequent tutorials to include stem cell research, gaps in service provision, and personal assumptions about politically correct behaviour. Key messages from tutorials were documented in the students' reflective journal entries. A rich discussion arose in every tutorial, with planned breaks frequently forgotten and respect for scheduled end-times often ignored. The energy was palpable and the learning, according to students' course evaluations, valuable and keenly appreciated. Evidence of the influence of ICE on tutorial discussions was prominent in many ways. Some examples are provided here:

- Ideas—Students shared diverse and numerous experiences relating to their own mentors and other mentors whom they heard about in tutorials. They described observations related to specific issues such as accessibility and social determinants of health that impacted their mentors. Students demonstrated a willingness for self-exploration along with new levels of awareness and learning. For example, many identified biases, assumptions and/or stereotypical attitudes of which they were previously unaware.

- Connections—Students gained the ability to compare and contrast their experiences with those of student colleagues during tutorial discussions, noting similarities and differences and making sense of them. These connections were often linked to previous personal experiences. They heard about others' judgments, assumptions, and attitudes leading to new deeper awareness of commonalities and differences.

- Extensions —Overarching themes that the students became aware of, learned from, and speculated about for patients/clients within the larger healthcare system and their own professional organizations arose during tutorial discussions. They considered how new levels of awareness, knowledge, and understanding affected their immediate personal and/or professional self-image. They speculated about their future professional identities and the influence of learning from their mentors and one another. They wondered what new insights might be taken into upcoming clinical fieldwork and beyond into professional practice, such as issues of advocacy, client-therapist boundaries, and health policy.

The last tutorial of the course culminated in a whiteboard collaborative exercise to gather students' collective lessons learned in response to the question "So What?". Numerous themes were identified and shared, resulting in the construction of a visual representation which was often included in the students' journals as a cue for concluding comments. (See photo and text box below)

Figure 1: Students answer the question, "So what?"

So What? Lessons Learned in OT825, 2013

- Remind yourself of your intentions going into OT
- Think about how you would want to be treated
- Take a holistic approach: the whole person, not a collection of symptoms
- You will be surprised by people's abilities
- Ask "is it OK?" Listen. Optimism helps. Learn from mistakes. Know your strengths.
- Terminology and language are important
- Involve family and support system
- Be aware of your limitations and assumptions
- Treat everyone as unique individuals
- Watch your presentation and professionalism

When I initially adopted the ICE framework, I fell into the trap of assuming that reflecting at the level of Extensions was the ultimate goal, an example of the kind

of linear thinking described by the editors of this book. With experience in using ICE, I learned that students often benefitted from returning to Ideas to reflect more carefully on the details of their observations and experiences before their natural tendency to jump to Connections or Extensions. The process of reflecting is cyclical in nature. It is enhanced when one returns to previous journal entries to consider additional thoughts that stimulate new ideas or highlight how one's perceptions may have shifted or changed in subtle or even substantive ways. This often occurred, for instance, when a student became aware of a previous assumption they held about their patient mentor, the healthcare system, or their own understanding of health challenges. I detected variations in the students' use of language and terminology that developed over the duration of the course, perhaps due to mentors' choice of words, course reading materials, and peer discussions. Students at times were aware of these developments with many describing them as personal '*aha*' moments of realization. Feedback that highlighted these shifts was used to further encourage students' learning. The opportunity for students to share, and occasionally debate, differing points of view within tutorials was felt to be a significant advantage of the course structure and content.

During the final course tutorial students often admitted, with some reluctance, that they had more questions than when the course began. This admission was rewarded when I reframed their comments as evidence of successful first steps on a complex journey of learning about and appreciating the experience of chronic illness or disability. By raising questions, exposing stereotypes and assumptions, and being challenged by patient mentors, peers, instructors, and themselves, they were better positioned to continue the journey of lifelong learning. I encouraged students to continue to engage in reflective journaling in their formal education and beyond in their practice environments, using ICE to foster ongoing professional development.

8.3 Impact

The ICE model kept me attuned to the specific points I felt were important for students to learn from and reflect on in greater detail. It guided me to look for specific examples and to justify my feedback for the students. As the course was classified as an applied fieldwork course, with a grade of pass/fail, students occasionally approached me, not about marks, but for qualification concerning feedback in their final performance appraisals from me or from their mentor. I found that the ICE/ORID rubric I had developed helped me to provide clear, unambiguous feedback, resulting in very few instances of students requesting such clarification.

Several positive ripples resulted from this course and its assessment model. I consulted with an occupational therapy professor from the Singapore Institute of Technology, who created a course using OT825 as its model and adopted the ICE assessment rubric to evaluate students. The OT825 rubric has been adapted for use in two courses about interprofessional education and practice in which I was involved: Interprofessional Collaborative Education (HLTH401) in the Queen's Faculty of Arts which was offered onsite at the Bader International Studies Centre in the UK, and Interprofessional Approaches in Healthcare (IDIS280) in the Queen's Faculty of Health Sciences which is currently offered online. The OT825 philosophy of patients mentoring students was used as a template for an interprofessional educational activity, "Collaboration in Action," with student teams from nursing, medicine, occupational therapy, and physical therapy working with patient mentors to develop theoretical care plans.

8.4 Conclusions and Caveats

I initially wondered if the ICE method was too similar to the ORID rubric already employed within the course, specifically if its components would merely echo those of the original rubric. My concerns were unfounded. Rather, ICE proved to be complementary and brought the content of the ORID rubric to life! It added a three-dimensional aspect to what could otherwise be used to report narrative, unidimensional concepts of objective, reactive, interpretive, and decisional information. I could have easily "ticked the box" if students touched on each of these levels of reflection, but instead, I was able to provide detailed feedback, acknowledging students' efforts and encouraging them to further their thinking and build on their understanding of patient partnership, the realities of living with a disability, and the healthcare system. The ICE framework helped me to guide tutorial discussions and convey clear student assessment with constructive feedback while providing a roadmap for students to engage in independent and thoughtful self-reflection: a win-win-win outcome for students, patient mentors, and course instructors.

8.5 Case Study

Figure 1. Bill Meyerman (with permission)

Bill Meyerman has lived with a spinal cord injury for the past 50 years since he was hit by a car at age five. He spent his childhood and teenage years living in a rehabilitation facility. After a career in social services, his occupation focused on raising his 2 daughters and assuming household responsibilities while his wife worked outside the home. "I am very frank with students and tell them about what is important to me. Politically correct language and labels aren't helpful. Call me crippled or handicapped – I don't really care. The rehabilitation I received as a youngster was about basic life skills and how to manage in the world as it is. I appreciate professionals who are honest and direct with me. I know that their expertise is valuable, but I will make my own decisions. Give me information and treat me with respect. I know myself and my needs best...and just call me Bill!"

Journal Entry

Figure 2. Reflective journal entry drawing

[Excerpt from student H's reflective journal entry. Permission to use this excerpt has been received from my former student, who requested that this pseudonym be used.]

"What have those hands been through? How long can the grip keep on holding, how long can he hold out the weight that is forever piling? Stay strong those hands, don't let go yet, there are still many aisles that you have to go down. If you feel tired though, we OT students are just behind you. Let us give you a hand."

Journal Feedback

[Excerpt from Instructor's final journal feedback review.]

December 2013

H: In the latter part of your journal, you reflected on past experiences of working in long-term care and the meaning of care in the greater sense of the word. Delving into past and current experiences and comparing/contrasting them in your journal appears to have led to new learning and ideas for your future practice. It also seems that you took the opportunity to engage in reflection in order to explore your own feelings and motivations for enrolling in this graduate degree…taking your reflection beyond the classroom and this course.

Your reflections of the 2nd and 3rd visits with your mentor were particularly poignant for me to read. They highlight two very different perspectives: "eating dinner with B and his family…is very much the same as it would be with any other family." You may have anticipated 'difference' but what you experienced was similarity…a relevant observation. Yet the visit to the grocery store illuminated differences…as did your drawing of B as he maneuvered through the aisles.

Reflection Components	Ideas	Connections	Extensions
Objective Level	Describes basic information of the situation/experience (e.g., visit with a mentor; tutorial discussion themes). Use of one sensory descriptor. (e.g. describing in detail what the student observed in the setting in which the visit took place)	Provides a thorough description of the situation, using at least two sensory descriptors. Inclusion of events outside of the immediate course content – i.e,. Campus accessibility, transportations system. Describes the context of the situation/experience	**Teacher Selected Rating Describes the situation in detail, including multiple sensory descriptors. Situation/experience is described in relation to past experiences. Discusses both the personal and the macro-level environment (i.e., socio-political).**
Reactive Level	Identifies a feeling/emotion or reaction related to the experience/situation.	Describes previous memories or experiences that influence this reaction	**Teacher Selected Rating Discusses personal reaction and relates this to the broader social environment.**
Interpretive Level	Discusses the meaning and significance of the experience. Demonstrates understanding of the meaning of one's own experiences.	**Teacher Selected Rating Discusses the meaning and significance of the experience and relates this to previous experiences. Demonstrates understanding of the experiences of one's mentor, student partner & colleagues in 825.**	Discusses the meaning and significance of the experience in relation to the broader social environment. Demonstrates understanding of the complexity of issues at multiple levels.
Decisional Level	Discusses future implications for personal awareness and interactions	Discusses future implications for personal interactions and professional practice	**Teacher Selected Rating Discusses future implications for personal interactions, professional practice, and health care provision. Discusses implications at a policy and socio-political level.**
Written Journal	Names of mentors & students, as well as identifying data, have been omitted to ensure confidentiality	**Teacher Selected Rating Takes needs of the reader into account in the presentation of the information (i.e., bolding, subtitles, spacing) Material is clearly written and presented with professional terminology where appropriate**	Vocabulary selected articulates ideas and understanding of the profession. Overall appearance and content demonstrate attention to detail and an effort to produce a document that is personally and professionally relevant

Figure 3. Journal Review Assessment Rubric

Final Evaluation

[Excerpt from Student's Final Performance Evaluation]

Student Name: H

Date: December 2013

Grade: Pass

Student's Personalized Learning Outcomes: 1. To be able to articulate the difficulties that a person with spinal cord injuries goes through. 2. To learn what traits the mentor values in an occupational therapist. Evaluation of learning objectives: You have successfully addressed your learning objectives within the course, as evidenced in your journal entries and tutorial contributions.

Volunteer Feedback: "H demonstrated a genuine interest in our meetings. I would say he is analytical and likes a challenge. He had good questions and was respectful in his approach to me. He interacted well with me and with a friend who is also a wheelchair user. I found him to be sensitive and a really good student. I think he will do well in his profession."

Journal Feedback: Your journal includes reflections at all levels of the reflection rubric. You provided honest and detailed comments. The latter half of your journal would benefit from additional organization...numbering pages and dating entries.

Tutorials: You were an active and engaged participant in the tutorial discussions, raising relevant issues and listening respectfully to the contributions of others.

Recommendations: I encourage you to continue to use journaling in future courses and fieldwork, as you are able to capture your learning in a creative and worthwhile manner.

It was a pleasure working with you in this course, H. Best of luck in your future endeavours.

[signature] Anne O'Riordan,

Instructor / Course Coordinator

Re

In Memoriam

Thank you to Mr. Bill Meyerman: a valued colleague, a talented mentor, my treasured friend (1963-2020).

Figure 4. Our trusted mentor and friend, Bill Meyerman

References

Fostaty Young, S. & Wilson, R. (2000). Assessment and Learning: The ICE Approach. Portage & Main Press.

Jamieson, M., Krupa, T., O'Riordan, A., O'Connor, D., Paterson, M., Wilcox, S. (2006) Developing empathy as a foundation for client-centred practice: Evaluation of a university curriculum initiative. Canadian Journal of Occupational Therapy, 73(2), 76-85.

O'Riordan, A., Peterson, J., Murphy, S., Parsons, T., Docherty, D., Parsons, J., Meyerman, B. & Paterson, M. (2011) Collaboration in Action: Health Care Education, Academic Exchange Quarterly, 15(4): 94-99, Winter 2011. Collaboration in Action: Health Care Education.

Paterson, M., O'Riordan, A., Jamieson, M., O'Connor, D., Krupa, T., Wilcox, S. (2000) Community partnership project: curriculum innovation in an occupational therapy undergraduate program. Education Through Partnership Journal. 4(2), p. 7-15.

Sok Mui Lim, Bhing Leet Tan, Hua Beng Lim & Zi An Galvyn Goh. Engaging persons

with disabilities as community teachers for experiential learning in Occupational Therapy Education. (2018) Hong Kong Journal of Occupational Therapy. 31(1). doi.org/10.1177/1569186118783877

Stanfield, Brian R. (2000) The Art of Focused Conversation.

Troop, M. & O'Riordan, A. (2017) The Patient as Mentor: Transformative Experience in an Occupational Therapy Course. Transformative Dialogues: Teaching & Learning Journal. 10 (3). November 2017 Online.

Chapter 9. Using the ICE Framework in a Second Year Research Methods Class

9.1 Instructional Context

Val Michaelson – Brock University
Kanonhsyonne Janice Hill – Queen's University

As a post-doctoral fellow cross-appointed between the Department of Public Health Sciences and the School of Religion and at Queens University, I was invited to teach the required departmental Research Methods course in the School of Religion. I was confident in the subject material, but I think, like many of us who are new to post-secondary teaching, creating a rubric and establishing a framework for assessment felt intimidating. I had taken a post-secondary teaching course at the Centre for Teaching and Learning at our University, and had learned about ICE. I knew it was evidence-based, and that a lot of very experienced teachers at the university were using it. I was so focussed on developing content and learning engaging teaching strategies that when I decided to use ICE as the assessment framework for our major assignment in research methods, I didn't give it much more thought than that.

My original plan had been to use ICE for assessment. However, as I designed the rubric, I realized that the rubric itself was shaping the way that I designed the assignment. In brief, the assignment was to demonstrate, through a 30-minute presentation, students' understanding of one research method that is used in social science research. In small groups, students chose one primary research study as the basis of their work, first as a catalyst for learning and eventually to illustrate their presentation. In their presentations, students were to teach the basics of the

method that had been used in this study and answer questions such as: What is the method? What theory grounds the method? How does exploration of this theory confirm, contradict, or even expand how you have understood the role of theory in research to date? Does the method involve generating data? If so, how is this done? What kinds of ethical issues or challenges need to be considered? This was an opportunity to identify steps in a process and describe specific features of the method under study. It was a very basic demonstration of Ideas. In their second step, students were to make Connections by finding an additional study that used the same or a similar method, and then compare and contrast the ways the methods were used in each study. The third part of their task involved Extensions – it was to imagine a research question they could answer with this research method and then design their own study, justifying their methodological decisions. Though it was not part of my original plan, ICE helped me to design an assignment that would move beyond simply conveying information to engaging students at much deeper levels.

The joy I saw in most of my students as they shared their own studies captured that spark that I had been hoping to see. Many of them had discovered that research is exciting and that there are tools we can learn that will help us along. And most important, that it's not just the professors who are researchers: they can learn to be researchers, too.

9.2 Discussion

The word research can be traced back to the 16th century French *recherche*. It means "to go about seeking…" As a social scientist, there are few things I love more than *"to go about seeking."* Mostly, I seek ways of contributing to solving critical problems, often related to equity and well-being. The research methods I use are my trusty "tools of the trade"; I see them as dependable old friends. But I also approach learning new methods with the zeal of a wilderness tripper finding a new map. The more attentive I am to all the map's details and intricacies, the more exciting research adventures there are to be had.

I admit, my enthusiasm for methods is peculiar. Though I have research colleagues who share my passion, when your teaching slot is late Friday afternoons in the winter in Canada, chances that your students will view learning about methods with as much enthusiasm as I do are low. I can't do anything about the cold and the dark or my time slot, but I am determined to draw my students into the excitement of research methods.

I divided the course into two parts. In part 1, we worked on developing skills of critical reading and thinking, and academic writing skills. I teach them how to do a focused library search, manage their citations, conduct a literature review and produce an annotated bibliography. These are some of the building blocks of research – the kinds of things you won't get very far without knowing how to do. To make it more engaging for the students, I invited them to choose their own topics for this background work, in preparation for what they would then do in the next section.

Part 2 of the course was devoted to learning a range of specific research methods. We began with an intense active learning class on Research Ethics. Each student also completed the Tri-Council Certificate of Research Ethics (CORE) and submitted a two-page reflection CORE. We followed this with a class discussion about the foundational and guiding role of ethics in all research. Then we prepared to dive in. This chapter is about Part 2 of the course.

What I Did

A wide and diverse range of methods are used in Social Sciences research. My job was to introduce my students to some of them. I had only six weeks to do it, and there was no way I could cover everything. My goal was simply to get students interested and give them a glimpse of the kinds of things academic researchers think about as we approach our work: things like positionality, theory, bias, ethics, sampling strategies, data collection and analysis, and the process of intentionally identifying the strengths and limitations of our work. One of my goals was to help them see that the methods we use establish the academic credibility of our work.

I also wanted this unit to change the way they approach reading academic studies. So often students have told me that they like to gloss over the methods section of academic studies and just get to the "important" bits. To me, success would be changing this pattern entirely. It would be making it so that even if a student was new to a method in a particular study, they would read through it carefully and critically, have good questions to ask and be able to make a basic assessment as to the study's overall merit. They would see that the research methods aren't boring and dry. In fact, the opposite is true. They are core to the "important bits."

I introduced the assignment at the beginning of the unit and using some of my own work as examples, I walked them through what they would be required to do: in groups, give a presentation in which they would teach the class about one method that is used in social science research.

The students then organized themselves into eight groups of approximately three people. Each group chose from a selection of twelve studies that I had curated for the class. I was intentional about choosing research done by several researchers in our own small department, and I was not surprised when these were especially popular choices among the students. Though I encouraged students to choose a study based on a research question that interested them, I reminded them that their main purpose was to pay attention to the methods. Their choices included an ethnography of Muslim girls in Canada, a qualitative study of sex and religion in Canada, a content analysis of American mega-church websites, and a quantitative study of religious involvement and adolescent risk behaviours and violence.

I was intentional about including several studies that were rooted in Indigenous

research methods. One of these involved the application of "Two-Eyed Seeing" as a decolonizing methodology; another used a community-based research method to explore the role of ceremonies in the lives of urban Indigenous youth. As a class, we read the Tri-Council Policy Statement Chapter 9: Research Involving the First Nations, Inuit, and Métis Peoples of Canada and had a long and intentional discussion about positionality and the importance of ethical and reciprocal partnerships, especially when non-Indigenous scholars are engaged in Indigenous research.

You may notice that I have yet to tell you about how and why I used ICE. If it seems like an afterthought in my description, it's because it was an afterthought in what I did. Originally, I had intended to use ICE as an assessment tool. I realized that if I was using ICE, it would also necessarily inform the design of the assignment itself: how could I assess Connections and Extensions if I hadn't asked them to make any throughout the course? In the end, once I started making my rubric, I realized I needed to redesign the assignment. Originally, I planned that through their Methods presentation, students would need to demonstrate a clear understanding of an Idea (the method). When I started using ICE, it helped me see that I also needed to ask them to make Connections. I did this by asking them to find a second study that used the same method, and compare, contrast, and articulate relationships (Connections) between the way the method was used in the first study and the way the method was used in a second, complementary study. ICE also pushed me to think about Extensions. I added a third component in which the students were responsible for extending their thinking beyond the work of other scholars and towards their own interests. Here is a more detailed outline of each step as it appeared in the final assignment.

Step 1: Ideas and Information

This step was about learning the basics. Using the method in the study each group had chosen as an illustrative example, the students were required to teach the method to the class.

Based on background reading beyond the study their group had chosen, they needed to tell us more about the method. Some of this they would learn from

class lectures, some from their own further investigation. I didn't have a singular textbook, but rather brought multiple methods books into the classroom, and had other resources on hold at the library that the students were free to consult. Since this was a second-year class and the topic area was new, I curated what I would consider "entry-level" questions about the various research methods that the students were discovering

- When and out of what discipline did it originate?
- What kinds of research questions is it useful for answering?
- What kind of theoretical framework is it based on?
- How versatile or adaptable do researchers find it?
- What kinds of ethical issues would researchers need to consider in relation to this particular method?
- What ethical issues were considered in the study you read?
- Every method has strengths and limitations, please tell us what they are in this particular method.
- How did the researcher in your study maximize the strengths and minimize the weakness? Does the researcher collect or generate data? If so, what tools or approaches are used?

As a first step, I walked the students through these questions as a full class, using several different studies as examples. My students were all new to these kinds of methods, and I made it clear that I was not expecting an expert analysis. I wanted a basic overview, and some careful thought into how this method works.

Step 2: Connections

The next goal of the assignment was to help the student create links between what they had learned in step 1 (with their primary study) and another second study. I wanted them to see that while researchers often make different methodological decisions, there are basic strategies that are transferred from method to method. They were to compare and contrast the way that the method was utilized between the two studies. (This was worth 5/25 marks.) Comparing and contrasting two studies was a skill that my students had already brought with them to class from

their first-year studies, so a short in-class review was all that was needed to scaffold this assignment.

Step 3: Extensions

The goal was to extrapolate from what they had learned in steps 1 and 2 and apply their learning to something novel: their own ideas. I put this step in, frankly, because I was using ICE. This meant that if I wanted to use the entire spectrum of the framework, I needed to make an Extension a legitimate part of the assignment. The students were required to imagine a research question that interested them: one that they could answer using the method they had been learning about. They then had to design the study. This was worth 2 marks out of 25. For their own study, they still had to go through all the questions that they had considered in the studies they had looked at in Steps 1 and 2. What strengths and weaknesses does this method have in relation to your research question? What ethical issues do you anticipate? The real question was: so now you know what you know about this method, let's think about what can you do with it!

Note that the final 4/25 grade points were for group participation, and 4/25 for the quality of the presentation itself) which were valuable, but that I will not discuss in this chapter. Here is a breakdown of the final grading.

ICE framework	Task	Grade /25
Ideas	Teach us about the method	8
Connections	Compare to another study that uses a similar method	6
Extensions	Imagine a study in which you would use this method to answer a research question of your own choosing	3
	Presentation quality	4
	Group participation	4

Figure 1. Using the ICE framework in a Social Science Rubric

9.3 Impact

The first part of the assignment went well. The students enjoyed digging into the studies I had chosen for them to look at, and as predicted, they were especially drawn to ones that had been conducted by their very own professors in the department. The Connections, too, were well done. Most of the students were readily able to compare and contrast the two studies.

It is when we got to the Extensions components of the assignment that everything came together. Now they were extending their learning to their own ideas and to a research question that they had imagined and a hypothetical study that they had designed.

Group after group, my students shone. Nearly without exception, the students appeared to have spent more time on part 3 than on parts 1 and 2. Why? Because they were so excited about the possibility of doing their own study. It was as if they had moved from seeing themselves as passive recipients of the research of others to being active participants in the research process on their own.

One group included a student who was a member of the Tyendinaga Mohawk reserve. This group designed a study that they proposed to conduct in a nearby First Nations Mohawk community. Drawing from the research ethics protocol (TCPS 9) that we had discussed earlier in the term, they planned to meaningfully engage with Elders through the use of community-based research methods. Students in one of the groups were also in the Religion and Violence class together and had come up with a qualitative study in which they could use qualitative interviews to study religiously motivated violence. Another group was in the Chinese religions class; they had been working with "photo voice" and designed a study in which they would look at cultural appropriation of icons in China. Some of the students were very interested in mental health and designed a qualitative study in which they would explore the influences of religion on the health of the LGBTQ2 community at Queen's University.

One said, "I've decided to do a master's degree because I want to do that study I designed." Another said that she had spent four years reading other people's

research and this was the first time in her whole degree that she could see herself as a researcher.

As their teacher, I felt a bit of pride: they got this. I taught them something. This was a kind of engagement I had not seen in part 1 of the course when I desperately tried to get them to distinguish between APA and Chicago formatting. They "got" that methods are useful. To a researcher, methods are like a map is to someone who is lost in the woods. In the end, I don't want to train students who can tell me what other people have done; I want them to see their own potential as researchers. I want them to be able to conceptualize a research study that they would like to lead in order to answer a research question that makes them curious.

I recognize that I would never have put this final "extension" component into the assignment if I hadn't been using ICE because I simply wouldn't have thought of it. Yet, it was the piece that provided the key to students synthesizing everything they had learned. I want to train researchers, who have the tools, imagination, and confidence to use their research skills to explore real research questions that interest them. The ICE framework helped me get there.

9.4 Conclusions and Caveats

I would definitely use this assignment again, but I would structure a few things differently.

1. I'd keep each of the three components of the methods presentation. However, next time would weigh the Extensions component much more heavily so that my assessment matches the importance of this component of the assignment. I have often heard that students use the weight of how something is graded to decided how much time and energy to put into a component of the course, and to decide how much I, as their professor, value a particular component. Fortunately, this time around the students engaged with it for the excitement and joy of designing their own research. I would reweight it because I saw firsthand the extraordinary value in this kind of imaginative Extension exercise to their ability to synthesize what they had learned. It helped them to make sense of their learning to the point where they could apply it in another context entirely.

2. I didn't actually tell my students I was using an assessment framework called ICE. In retrospect, I would do that differently because I think that the assignment would have been even more effective if the students had understood how I was approaching both the design and assessment of the assignment through ICE. Using ICE helped to clarify my own thinking about what I wanted the students to get out of the assignment. If I had talked to them about this assessment strategy from the beginning, I think it would have helped clarity the goals for them as well. ICE helped me design the assignment in a clear way so that students could understand what was expected of them in terms of outputs and assessment. It also helped me to design the assignment in a way that pushed the students into some real-world applications.

3. In the future, when I introduce the assignment at the beginning of the unit on methods, I will draw attention to the rubric so that students understood how they are going to be assessed.

I used ICE as an afterthought because I needed some help with my rubric. Now that

I see the way it turned my assignment away from a focus on knowledge recall to knowledge application and meaning-making, I'll be much more intentional about how and why I use it.

Many people will read this book who have been teaching at the post-secondary level for decades. My simple approach to ICE won't likely inspire new ideas in your own work. But for those of you who, like me, are at the early stages of post-secondary teaching, I highly recommend ICE, above all for its simplicity and flexibility. As I found out, it is much more than an assessment tool. It helps educators design assignments that truly engage.

Chapter 10. The Evolution of Medical Education

10.1 Instructional Context

Shayna Watson – Queen's University

In this chapter, I review innovations in medical education over the last century through the perspective of ICE, a learning framework characterized by "opportunities to engage in critical thinking, and creative problem solving as ways to enhance learning" (Fostaty Young, 2005). I propose that there has been a move from a focus on Ideas to one trying to educate through connection, connection of content to context, and when educating for Connections across context we can see the beginning of intention to educate medical students with Extensions in mind.

In medical education we are not testing students for ICE – we are infusing their education with opportunity to take their learning in that direction, a direction that is not linear, but like a double helix, deepening over time and stabilized by connections and cross-linkages. The ideal educational experience affords time for learning, is based in patient care, and richly interconnects with students' previous experiences. It is an education that is experiential and helps students to satisfy requirements and attain competencies but is not limited by them. It is an education in which students are active and legitimate members of communities of practice, with ongoing learning relationships with patients, preceptors, and places. Students who learn certainty, seek certainty and students who learn in complex ways and environments are comfortable in the complex messiness of the real world. If we educate students to see Connections between their various experiences and domains of learning, articulate relationships, and connect skills in novel ways then they will bring these skills to their practice, it will encourage them to extrapolate

to novel situations with confidence in their ability to anticipate and plan for varied outcomes.

10.2 Discussion

In the early twentieth century medical schools in Canada and the United States were unregulated and highly divergent in approach and output, not all were university-affiliated. Some were within universities modelled on the European research universities —with libraries established as repositories and markers of knowledge, and research laboratories celebrated as places of scientific enquiry. Johns Hopkins University was the American realization of the European model and was likely the gold standard to which Abraham Flexner compared all other medical schools when he was asked by The Carnegie Foundation to review the more than 150 medical schools in Canada and the United States.

In 1910 Mr. Flexner's final report, proposed an educational structure for medical education, one rooted in the bio-medical model which identified teaching hospitals, libraries, and laboratories as necessary elements for a medical school. The Flexner Report also drastically reduced the number and diversity of medical schools. By outlining what he deemed to be the proper training to produce physicians skilled to ensure the safety of the population, Flexner's report resulted in institutional homogeneity to a white, male, Eurocentric norm (Harley, 2006).

Flexner proposed at least two years of science focused education prior to a standardized four-year medical education:

> "In general, the four-year curriculum falls into two fairly equal sections, the first two years are devoted daily to laboratory sciences, – anatomy, physiology, pharmacology, pathology; the last two to clinical work in medicine, surgery, and obstetrics. The former are concerned with the study of normal and abnormal phenomena as such; the latter are busy with their practical treatment as manifested in disease" (Flexner, 1910, p. 57)

This two-plus-two model, linking two years of learning in scientific disciplines with two years of clinical training in hospital and outpatient settings, quickly became the norm. Learning in medical schools focused on the acquisition of information, on

the transfer of knowledge from professor to student, from book to mind. Globally, more than a century later, we still see centralized, content-focused, science-based, university-affiliated medical education where the accepted tools of medical pedagogy are: didactic schooling; exposure to scientific disciplines, and clinical preceptorships; and criterion-based assessment with normative ranking within class groupings of peers.

The Starting Point

Since Flexner, the first two years of a medical education have focused heavily on the rapid acquisition of vast amounts of content—an immersion in Ideas. The scientific disciplines are primarily taught as discreet entities with little cross-pollination until the clinical application in the final two years of medical school when integration across disciplines and Connection between the student's basic sciences education and the patient context became relevant. The final two years of medical school are a mixture of clinical learning in hospitals and outpatient facilities with graduated contributions to clinical service in those environments. The medical student takes content from lecture and laboratory work in the first two years and applies it to the assessment and care of patients.

From the perspective of the ICE model[3] we can see a heavy focus on the transmission and acquisition of Ideas, both in terms of pre-medical preparatory education and in the first two years of medical school itself. The final two clinical years can be viewed as a time of making Connections between prior learning and the clinical environment, of connecting theory to the reality of patient context.

Step 1. Problem-Based Learning: From Ideas to Connections—Let the Problem be the Teacher

As new research findings alter the practice of medicine so too does evidence inform pedagogy. Over time we have seen changes but few direct challenges to Flexner's two-plus-two model. Only two (McMaster and Calgary (Lampard et al., 2021) of the seventeen medical schools in Canada offer their programmes over three years. In the late 1960s, McMaster University's medical school was founded around the idea that students should be immersed in the richly connected, extended scenario

of the patient presentation, and that those should be the anchor for learning. Both McMaster and Calgary employed problem-based learning (PBL) curricula and intentionally constructed system-based patient scenarios through which students learnt the basic sciences and clinical skills relevant to the cases. PBL starts with the highly complex and connected patient case and challenges students to understand it by asking questions to structure their learning. The goal is not to arrive at an answer or to solve the case, but to learn from it. The traditional and hierarchical direction of learning from microscopic to macroscopic was reversed in PBL where learning begins with the person/patient and the student learns specific content (Ideas) in order to more deeply understand the patient case. Information is learned in the clinical context and applied and Connections are made to patient care immediately. The approach recreates an iterative process authentic to the clinical setting.

From the perspective of ICE, we can see the McMaster and Calgary models as desire to teach ideas in the web of connections in which they exist, to take Ideas, Connections, and Extensions out of a linear hierarchical relationship, and instead to train students to understand the Connections as they acquire the fundamental Ideas of medicine and hone analytical skills to evaluate and extrapolate Extensions to their learning.

Step 2. Under Construction

In the 1980s in Ontario, a process of patient and consumer consultation (EFPO – Educating Future Physicians of Ontario)(Neufeld et al., 1998) was undertaken to elucidate societal expectations of physicians and to guide medical education. The ensuing distillation of public expectations of physicians into defined roles would come to be known as the CanMEDS roles (Royal College of Physicians and Surgeons of Canada, n.d.). Each of the seven roles (professional, communicator, collaborator, scholar, health advocate, leader, medical expert) parsed out the interconnected actions and expectations of physicians and was defined by a set of competencies. This framework shaped and organized aspects of medical education and has been adopted internationally and contributed to competency-based education in postgraduate College of Family Physicians Canada Triple C)[4] and undergraduate medical education. (Butt & Duffin, 2018)

In medical education competencies are defined as "an observable ability of a health professional, to integrating multiple components such as knowledge, skills, values, and attitudes" (Frank J et al, 2010, pp. 638–645); competencies became the observable, measurable assessable substrate of competency-based medical education (CBME). In Flexner's two-plus-two model, medical education was time-based, with a set beginning and end without regard for a student's individual interests, aptitudes, or career goals. When educators began to work with the CanMEDS framework and competencies it became necessary to consider learning as something more than timed exposure to a discipline. CBME brought the linear and architectural construction of medical education into question, casting doubt on perceptions that "(c)ompetencies can be assembled like building blocks to facilitate progressive development."(Frank J et al, 2010, pp. 638–645) CBME is a behaviourist approach with clear expectations and standard performance goals based on competencies. No longer was mastery of content or passage through the two-plus-two programme enough to make one a physician.

CBME is structured with graduated responsibility and individualized rates of learning. In this model, expertise is the normative standard and it requires mastery of defined content and the demonstration of specific skills and competencies. The detailed picture of progress, skills, interests, and challenges is held in a portfolio of assessments, containing micro-formative instead of large summative assessments. Increased responsibility is not granted by one mentor-preceptor, instead, the role of the arbiter is played by the proxy master of large data sets—an accumulation of specific data points that indicate progress and readiness for increased challenge and responsibility. This model documents concrete actions but can risk overlooking ways to assess integration through Connections and Extensions. One can argue that CBME allows learners more latitude in terms of timing and sequencing of learning with the opportunity to focus on areas of interest and that by tracking and documenting the attainment of competencies learners can document their own trajectory of mastery from novice to expert.

Approaches like CBME are helpful to clearly define competencies and the constituent skills, but the risk is that in so doing we might actually limit learning to just those elements. Early proponents listed the "threat of reductionism."(Frank J et al, 2010, pp. 638–645) as a predictable risk of CBME. At the same time, CBME can be considered a more ecological approach to constructivism, one that is iterative and allows for emergent and integrated learning outcomes. The application of the ICE

philosophy in this context might eschew the reductionist possibility of CBME and ensure that learning and assessment embrace unlimited possibility. This inclusion of ICE in CBME would position the ability to see Connections and find Extensions as core competencies for medical education.

Step 3. Integration for Connections and Extensions

Students are no longer expected to graduate from medical school ready to practice, as they would have in the time of Flexner, but ready to pursue postgraduate training in a residency programme that is either generalist or specialist. The generalist is dedicated to connected coherence and is expected to see the patient in their full psychosocial context, advocate for, and modify approaches to ensure equity of care and social accountability. The generalist has a wide knowledge base and is called upon and expected to make multiple and varied Connections and Extensions. The specialist has deep mastery of a defined area and is valued for expertise that includes the ability to make Connections and Extensions over a deeper but more narrow field. Whether generalist or specialist, the pace of new information is such that no physician can practise with a static body of knowledge, new information must constantly be integrated into each physicians' existing knowledge base. In the ICE model, students compare their own learning to their own previous states (Fostaty Young, 1995 p. 2) and it is this skill that is required for life-long learning in the ever-changing and expanding fields of clinical practice. Medical education must include opportunities for students to assess their own learning and build self-regulatory competence which is a professional expectation of physicians.

The clinical years of medical education have a generalist range and are divided into blocks or rotations measured in weeks—mini-apprenticeships where students learn the content and culture of various specialties. These core block experiences in which students master the skills and behaviours required to perform in that context are typically delivered in a university teaching hospital, as Flexner wished. The work for the student is performative and normative.

Over time, there has been more learning in ambulatory and community settings, places of rich learning opportunities. One such approach is the Longitudinal Integrated Clerkship (LIC), a community-based experience in the clinical years of medical school. LICs have been increasing in number steadily over the last 20

years. In the LIC model students are attached to a preceptor rather than a specific hierarchical team providing hospital service, and blend learning from multiple disciplines to care for people, rather than performing the acts of a discipline. The model is varied in its implementation but is based on the continuity of relationships, relationships between student and preceptor, student and patients, and student and place. The student is welcomed into an established medical community and given a meaningful role. Legitimacy is conferred and the student becomes a functioning member of a community of practice. The student is known as part of the team and comes to know patients over time—content, context, and clinical application are integrated. In this model, students are challenged to recall previously learned content and apply it in a different context, and competency is demonstrated by the ability to apply learning in a variety of ways, to connect knowledge in new ways, to detect patterns, and make creative Connections. Students follow patients over time and follow their journey through the health care system. Students are encouraged to make Connections across disciplines and care environments and the Extensions of learning beyond the mandatory encounters and core content of a traditional discipline-based core block clerkship.

When students learn in discipline-focused blocks they may develop a false sense that things are clear—in the cardiology clinic almost all chest pain will be cardiac in origin. The LIC may be seen as an ecological constructivist endeavor, one in which the student moves across the landscape of a health care system and comes to know its topography. In the LIC model, students learn across disciplines simultaneously and will be expected to assess complex and undifferentiated problems. There is an inherent growth orientation to this model of clinical education where the students, immersed in the world of Connections, learn how systems and individuals interact, and by seeing undifferentiated problems they need to be creative and think critically. Students deepen their learning by applying knowledge from one context to another. By placing students in these environments, we show our respect for them; we teach that we value them as participating members of the health care team. We also demonstrate that we trust them to cope with the complex reality of practice and to be part of the real work of the environment. We teach them that they are not just tourists; they are team members and contributors to the care they witness and, increasingly over time, provide.

In the ICE model:

"at (Fostaty Young, 2005) the Extensions stage, new learning is created from old so that students are able to use it in novel and creative ways that may well be quite far removed from the original learning context. The learning becomes internalized to such a degree that it helps students answer extrapolative questions, articulate implications, and anticipate outcomes."

This can also be said of the LIC model where there is unscheduled time for students to pursue learning opportunities and follow patients over time. This affords students the space and freedom that comes from decreased structure. When teachers relinquish control in the learning environment there is room for possibility, for Connections and the application of previous learning in new environments and novel situations. Connections are what happen for the student, they are not observations that we can provide to students in a lecture, we need to engage students in real experiences to allow them to make their own connections, to give life to the material and their own learning. In both the LIC and ICE models, educators create experiences to allow learning to happen rather than dictate it. Those who educate in these ways know that prescriptive objectives focus students' attention only on that which is asked, thus limiting their learning. By opening up learning, loosening the controls, by setting fewer parameters and objectives, students are freed from the limits of our expectations; they experience the freedom to learn what is linked to practice, to follow their interests, and to learn in service of their patients. Is this not the ultimate goal of a medical education? Permissive experiences invite expansive learning.

Step 4. Decentralizing Education—The Library is With You

Community-based educational experiences are greatly aided by the decentralization and democratization of information with the internet. Students are no longer tied to labs and libraries for information and we have to wonder if some of the reasons for Flexner's desire to centralize medical education might no longer hold.

Freedom from the library as a physical space further dismantles the need for the structure enshrined by Flexner and has opened possibilities for other kinds of learning—learning in the lived spaces of context and Connections. By situating foundational learning in communities, students learn ideas and make connections simultaneously, as the constructed cases of PBL were designed to do.

[4]https://portal.cfpc.ca/resourcesdocs/uploadedFiles/Education/_PDFs/WGCR_TripleC_Report_English_Final_18Mar11.pdf

[3] http://activellj.mediasitecloud.jp/Mediasite/Play/e415fc9ea76140fd96a979a83e704e141d

10.3 Impact

ICE is a framework, an approach to assessment and the construction of learning opportunities that, like CBME, is learner focused and malleable. Each student is on their own path and learning will not be linear. The ICE framework gives freedom to the student to understand and interpret the competencies and roles that go far beyond a tick box approach to skill acquisition. ICE is not a rubric applied to student learning; it is the pedagogical freedom for educators to structure experiences that will result in opportunities for students to take their Ideas, content, and information and test it in new contexts, to see it from different angles and to construct it in novel ways. It's the realization that student experiences, creativity and imagination drive real learning. The content blocks of the pre-clinical medical education can be used in specific disciplines in prescribed and formulaic ways, but the transformative learning for medical students comes when they have the space to apply a piece of information from a lecture, with the memory of a previous patient encounter to a patient seen in an entirely different context.

The tension between Ideas and Connections in medical education is reflected in the tension between the rational sciences learned in the sterility of a lab and the messy reality of real-life and disease as experienced by patients. The practice of medicine, not a purely technical or scientific enterprise, is an art informed by science. In order to apply scientific and classroom/laboratory learning to patient care, students must learn how to make Connections and apply information learned in one context to a variety of other contexts which may or may not resemble the original learning context. So, a true assessment of students' capacities and skills will necessarily interrogate their ability to make Connections—to bridge the pre-clinical/clinical divide. ICE is explicit in the ways it values the meaning-making required to connect new learning to old, and the associated necessity of structuring learning and assessment opportunities that invite demonstration of those connections. Medical education has a long history of assessing ideas and skills, and ICE makes it clear that we are not yet assessing the full range of skills and capacities we are teaching and which we expect of physicians. There remains much work to do.

10.4 Conclusions and Caveats

Guided and constrained by international accreditation standards, medical education is inherently conservative. It is also restless, every hurrying to integrate new research findings to practice and use emerging evidence to inform pedagogy. Medical schools in Canada are accountable to societal needs, and while fine-tuning their programmes in small ways for each new class they also keep one anxious eye on the horizon to anticipate what might come next and remain nimble to adjust course for the unexpected.

Though Mr. Flexner could not have anticipated these changes in medical education, they have been predictable in their direction toward teaching in the real context of care delivery to train students to become physicians skilled—not just in acquiring information, but also in making Connections and seeing Extensions, to imagine new ways of working and solutions to old and new problems. The unique skills gained through a medical education are the abilities to form Connections and apply information in novel contexts, to make Extensions.

In medical education, we are shifting our focus from approaches that value learning large masses of information to one where we seek to create student experiences based in patient care and richly interconnected with other learning experiences; an experiential education to attain professional competence by becoming an active and legitimate member of communities of practice with ongoing learning relationships with patients, preceptors, and communities. By learning in a complex reality we show students that learning deepens over time and is stabilized by Connections and cross-linkages. We are offering an education not measured by ICE but infused with it. When we educate students to see Connections between their various experiences and domains of learning, when we articulate relationships and connect skills in novel ways then they will bring these skills to their practice, it will encourage them to extrapolate what they know to novel situations with confidence in their ability to anticipate and plan for varied outcomes.

ICE frames learning as filled with potential, as constructed webs of understanding, ICE is a language of possibility. ICE acknowledges that learning is not linear that it is iterative and messy, a student must learn and relearn the basics as new evidence

emerges and as other learning sheds new light on old certainty. By learning in this way students become familiar with the whole territory of learning, the rich cartography of an academic domain. This is the true realization of Extensions—the learner becomes a practitioner who can move freely across the landscape of their discipline and demonstrate new Connections and Extensions to expansive possibilities.

Both ICE and medicine are inherently constructivist, both employ an approach to learning based on growth and understanding networks. Medical learners and physicians develop competence through the experience of making Connections and demonstrate expertise when they extend what is known when they can entertain a novel possibility, see new patterns and possibilities. As we educate medical students and design educational experiences with the goal of Extensions in mind, we see that medical education is aligned with, and well served by, the ICE framework.

When viewed through the lens of ICE, we can view changes to medical education, within the consistent Flexnerian structure, as a move toward pedagogies that support Ideas, Connections, and Extensions as the fertile landscape for professional education and lifelong learning. We can see that changes in medical education have moved toward: the application of Ideas in real-world situations and engagement with real problems, learning how to learn, basing action in evidence and experience, seeing the Connections and integration of knowledge and action, and positioning students to use formal education as the beginning of limitless learning.

Though medicine is slow to change and can feel plodding in development, it is also in the business of possibility and future-oriented toward limitless learning. Changes in medical education in the century since Flexner's report have been more inclusive of these elements, medical education has evolved in ways that ensure a common knowledge base of Ideas and content, with increasing value placed on early opportunities to see the Connections between areas of learning and a desire to situate students for success as physicians adept at making Extensions. The history and structure of medical education align with the elements of the ICE model and at each turn of the cycle of pedagogical development in medical education we see changes that make space for the full realization of the ICE philosophy. Like a plant growing in the direction of the sun, medical education since

Flexner has made growth in the direction of Connections and Extensions—toward the philosophy of ICE.

References

Butt, H., & Duffin, J. (2018). Educating Future Physicians for Ontario and the physicians' strike of 1986: The roots of Canadian competency-based medical education. *Canadian Medical Association Journal, 190*(7). doi:10.1503/cmaj.171043

Flexner, A. (1910). *Medical Education in the United States and Canada: A report to the Carnegie Foundation for the Advancement of Teaching.* Merrymount Press.

Fostaty Young, S and Wilson R. (1995) *Assessment and Learning: The ICE Approach.* Portage & Main Press

Fostaty Young S. (2005) Teaching, learning, and assessment in higher education: Using ICE to improve student learning. *Proceedings of the Improving Student Learning Symposium, 13*, 105-115.

Frank, J. R., Snell, L. S., Cate, O. T., Holmboe, E. S., Carraccio, C., Swing, S. R., Harris, P., Glasgow, N. J., Campbell, C., Dath, D., Harden, R. M., Iobst, W., Long, D. M., Mungroo, R., Richardson, D. L., Sherbino, J., Silver, I., Taber, S., Talbot, M., & Harris, K. A. (2010). Competency-based medical education: theory to practice. *Medical teacher, 32*(8), 638–645. https://doi.org/10.3109/0142159X.2010.501190

Harley, EH (2006). *The Forgotten History of Defunct Black Medical School sin the 19th and 20th Centuries and the Impact of the Flexner Report. 98(9)*, 1425-1429.

Lampard, R. (2020). *Creating the future of health: The history of the Cumming School of Medicine at the University of Calgary, 1967-2012.* University of Calgary Press.

Lampard, R. (2021, May). *The history of the Cumming School of Medicine.* Alberta Doctors' Digest. https://add.albertadoctors.org/issues/may-june-2021/history-cumming-school-medicine/

Neufeld, V. R., Maudsley, R. F., Pickering, R. J., Turnbull, J. M., Weston, W. W., Brown,

M. G., & Simpson, J. C. (1998). Educating future physicians for Ontario. *Academic medicine : journal of the Association of American Medical Colleges*, 73(11), 1133–1148. https://doi.org/10.1097/00001888-199811000-00010

CHAPTER 11. ICE AS AN EDUCATIONAL DEVELOPMENT TOOL

Chapter 11. ICE as an Educational Development Tool

11.1 Instructional Context

Sue Fostaty Young – Queen's University

I've worked as an educational developer for close to 25 years. The focus of my work has always been in finding ways to help post-secondary instructors improve their teaching for the express purpose of improving their students' learning. Of course, as the literature tells us, meaningful and lasting changes in teaching practice aren't likely to happen without some kind of change in, or development of, teachers' conceptions of teaching and learning. That being the case, the goal of educational development is to help teachers develop increasingly sophisticated conceptions of teaching and learning while at the same time supporting the acquisition and development of the teaching skills they'll need to enact those newly developed conceptions. So, in many ways, my practice has been focused on helping instructors think about their teaching in ways that are different from the ways they habitually do. That sounds easy enough except for the fact that very few post-secondary instructors come to their positions with any pedagogical background. That might mean they haven't yet adopted an overarching conceptual framework or operational theory of learning to rely on to articulate their expectations for students' learning or to reflect on their teaching. Without that ability to accurately name and frame their beliefs and values or, for that matter, name what it is they do and why they do it, it can be exceedingly difficult to work toward or plan for improvement.

Over the years, I've discovered that inviting conversations about their assessment choices enables instructors to express the sometimes tacit system of beliefs and values on which they base their teaching and assessment practices. It gives them a chance, sometimes for the first time, to inquire into the aspects of their practice

that are purposeful and quite intentional and the others that might actually be surprisingly inconsistent with their stated intentions.

Conversations about assessment are, at their core, conversations about learning. In causing instructors to shift their attention away from teaching (i.e. what they do) to focusing on learning (i.e. what their students do) we can begin conversations about the ways instructors make decisions to evoke that learning for their students. In making their tacit practice explicit, they then might be able to become more intentional and make a shift from trying to merely adopt "best practices" to a more invested exploration of "best principles" for their own system of values. In this way, my educational development practice has become entirely learning assessment-focused and entirely facilitated through ICE.

11.2 Discussion

It's ironic that assessment now takes up such a significant part of my professional life. I spent my early academic career avoiding anything to do with assessment. My aversion to the topic stemmed from resentment of the ways that assessment had been done to me as a post-secondary student – testing recall of minutiae; poorly crafted multiple-choice questions with no opportunity to explain my thinking; one-size-fits all projects that didn't fit my interests – I wanted nothing to do with perpetuating that kind of practice. It wasn't until I had the opportunity to work with Dr. Bob Wilson, the originator of the ICE model, that I began to appreciate the potentially transformative effects of learning assessment when it's purposefully designed for students and their learning. My own transformative learning experience was so complete that now both my teaching and development practices are largely dedicated to improving teaching through improved understanding of assessment.

I use ICE as an educational development tool in that it frames everything I do. The model, comprehensive yet simple without being simplistic is, in fact, a shorthand for an entirely complex conception of teaching and learning. It's fully congruent with my own conception of learning as a non-hierarchical, non-linear, reiterative learning loop of developing expertise. What's more, the model distills cognitive-transformative theories of learning into a highly accessible framework that seems to resonate with many instructors' experiences of what learning looks like, no matter what discipline they work in. In many ways, ICE seems to be intuitive in that many instructors insist that, yes – that's exactly the way they've conceptualized learning all along but hadn't the ability to articulate. A bonus is that the vocabulary supplied by ICE provides a reliable kind of portable framework that helps instructors organize their thinking about teaching, learning, and assessment in ways that enable them to conceptualize and communicate their expectations and intentions more easily and with greater clarity.

Because Bloom's Taxonomy is arguably the most well-known model of learning, even instructors without much pedagogical background seem to have at least a passing acquaintance with it. If that's the case, we start there. Almost invariably instructors report that, initially, they found Bloom's to be very helpful but, after a

while, it didn't seem to work for them. Probing for specific examples of how and why the model stopped being utilitarian often results in reports that the seven hierarchical levels were perceived as too finely drawn or that the taxonomy is a little unwieldy to expect students to be able to benefit from. What's more, the hierarchical nature of Bloom's meant that instructors seemed to spend a lot of time at the lower end of the pyramid. After all, Bloom's Taxonomy does presuppose that a learner must be proficient at one level of the pyramid before being able to be successful at the next. It's at this stage that I often initiate a conversation about episodes of learning that seem to defy the notions of learning as linear and single domain-specific and ask the instructors(s) if they can identify any instances from their own experience that help to illustrate either the linearity or recursivity of learning and which makes the most sense in their current context. It's essential to me that I meet instructors where they are both contextually and epistemologically. The process of development means that my job is to help each individual to grow from their own place of readiness and at their own pace.

My entire educational development practice – workshops, consultations, resource development, and general discussions – is structured in ways that put the focus on students' learning. Throughout are invitations to educators to articulate, as best they can, what their expectations for learning look like. Typically, only after initial engagement with their own course and assessment practices and perhaps reviewing some examples of students' work and discussing the ways those samples met and fell short of expectations, will I introduce ICE. It's then that I might invite instructors to use ICE as a lens through which to revisit those work samples or to use ICE to describe their learning expectations. That simple exercise is an episode of supported practice with using the ICE model. Almost immediately, instructors experience a greater sense of clarity.

In sharing ICE with instructors, either as part of a Departmental, small group, or individual consultation, I rely heavily on storytelling, examples from my own experience, and from across the disciplines that illustrate the conceptual points I'm trying to make. Those stories serve multiple functions. First, they illustrate and concretize the theories and conceptions. Secondly, they serve as a tacit invitation to those present to begin their own process of meaning-making. Lastly, storytelling is a way of modelling how to make Connections. That process, I believe, works to help illustrate the ways in which ICE might become more relevant to their own context. Storytelling and encouraging others to tell their own stories of assessment

and conceptions of teaching are also ways of acknowledging and validating the varying instructional contexts of others. It also serves as an effective way for me to ascertain the storyteller's grasp of the concepts and of ICE itself.

Conversing about the ways ICE (or any other Taxonomy of learning) is congruent with their own conceptions of learning is an essential component of the development process. That said, probing about the ways that ICE is incongruent with their conceptions and instructional context invites a certain criticality that helps draw out tacit assumptions and beliefs about teaching and learning. When consistently encouraged to adopt such a critical stance, instructors are actually being invited to explore the ontologies of their own conceptions, again helping to make the tacit explicit. I repeatedly tell instructors that I'm not trying to sell them on ICE; what I am trying to do is encourage them to find and adopt a conceptual framework of learning that resonates with their values and beliefs and that can reliably serve as a touchstone to inform their practice and, ideally, be shared with their students. The value of frameworks is that they are both rigourous and flexible: They provide structures and parameters that enable naming and framing of practice that help us focus on different schemas for questioning assumptions and understanding learning but they should be flexible enough to be adopted and adapted to suit a wide range of contexts.

Another strategy I use is to invite instructors, with ICE as a reference point, to scrutinize the relative success of one of their final exams in assessing the learning for which it was intended. Typically, instructors report that the intention of the exam was to assess students' ability to make Connections and Extensions. Also, typically, after question-analysis using ICE as a reference, many discover a heavier-than-intended reliance on Ideas-based questions. Conversations then ensue about the precision of language necessary to evoke intended learning, the value of tables of specification for exam construction, and of blueprinting assessments against learning outcomes—all of which results in awareness of the importance of intentionality in assessment design and instructional decision-making. In addition to that growing awareness, whenever possible, I try to embed activities that result in positive supported practice of new skills. Ensuring even a brief episode of practice means that conceptual development and skill development are occurring in tandem.

I use the term "guided alertness" to refer to the process I use to draw people's

attention to their intentions, whether they're tacit or explicit, for students' learning. I have a penchant for prefacing almost all my answers to questions with "that depends". I suppose it's a way of drawing attention to the fact that context is everything when it comes to teaching and learning and what might be considered best practice in one context might not be in another. Additionally, if a best practice is incongruent with an instructor's set of values, it's highly unlikely to come across as "best". "That depends" models my resistance to the notion of best practice and guides instructors' alertness to the importance of intention and context. From that perspective, my Swedish colleagues have dubbed my approach to ICE-informed educational development as "non-normative". I prefer to think of it as an example of meeting people where they are developmentally and contextually.

ICE also provides me with a framework through which to interact with, interpret and answer instructors' questions. Using ICE as a filter, I can interpret the language of a question to determine if what is being asked for is a clarification of Ideas, a request for a nudge toward Connections, or that someone is close to a breakthrough Extension. The cues that ICE language provides enable me to be responsive to learning needs and to anticipate and create opportunities for learning or discussion. Using ICE in this way means that my practice is both informed and supported by the framework.

11.3 Impact

Instructors tell me time and again that learning about ICE has had transformative effects on their conceptions of teaching and learning, even for those who might already have had ones that are comparatively sophisticated and complex. It seems that because the framework provides such a reliable, accessible, and portable way of organizing their thinking about teaching, learning, and assessment, the users gain a sense of clarity. That clarity in turn enables an intentionality to their teaching that many hadn't experienced before. Even some who report having made no changes to their teaching practice or instructional decision-making say that ICE has enabled them to be more intentional in their teaching and that they can now explain why they do what they do. More than anything else, instructors report that the greatest impact related to their introduction to ICE was that they gained a reliable way of organizing their thinking about teaching and learning which enables them to adopt a clarifying way of communicating with their students about learning and assessment. They often report gaining greater awareness about the effects of their assessment plans on students' approaches to learning and the critical importance of ensuring congruence among the elements of their courses' curricula. The end result for many is a satisfying sense of increased confidence in their abilities to facilitate learning.

11.4 Conclusions and Caveats

Because what and how a teacher chooses to assess has such a profound effect on what and how students learn, I believe it's essential to get assessment 'right' – to ensure that assessment practices reliably support intended learning so that valid interpretations of students' learning achievement can be made. Time and again I've seen the positive impact on teaching development and subsequently on learning achievement when instructors and students better understand the structure of assessment, its purposes and its power. It certainly isn't necessary to use ICE to engage in assessment-focused educational development. What *is* necessary is ensuring an alignment between one's conceptions of teaching and learning and the model one adopts to practice. Intentionality is key.

Appendix

Chapter 1: Introduction to the ICE Model

Figure 1. The ICE Model

Three gears whose motion influences the others. Each gear represents one phase of the ICE model: Ideas, Connections, or Extensions. The Ideas phase of learning includes understanding the fundamentals, facts, discrete skills, or steps in a process. It includes vocabulary, definitions, information, and discrete concepts. The Connections phase of learning includes the ability to articulate relationships, relate new learning to what is already known, and combine two or more discrete skills. At the Extensions phase of learning, individuals extrapolate learning to novel situations, they postulate or anticipate outcomes, and they understand the implications of new learning. At this phase, individuals can hypothesize.

Figure 2. Terminology often used at the Ideas phase of learning

Speech bubbles: recite, name, label, memorize, repeat, calculate. Additional terms used include assemble, cite, compile, define, describe, duplicate, follow, identify, imitate, list, locate, mimic, operate, participate, recall, recognize, replicate, report, reproduce, state, tolerate, trace.

Figure 3. Terminology often used at the Connections phase of learning

Speech bubbles: adapt, infer, differentiate, reframe, compare, solve. Access the Appendix for a full list of terms. Additional terms include adjust, apply, blend,

calibrate, categorize, classify, code, collate, combine, compute, convert, coordinate, diagram, discriminate, distinguish, estimate, illustrate, integrate, match, modify, organize, paraphrase, rank, relate, translate, test.

Figure 4. Terminology often used at the Extensions stage of learning

Speech bubbles: analyze, rationalize, create, design, defend, predict. Access the Appendix for a full list of terms. Additional terms include anticipate, appraise, compose, critique, evaluate, extrapolate, hypothesize, interpret, invent, judge, justify, propose, project.

Chapter 1 Image References:

Based on the ICE taxonomy described in:

Fostaty Young, S. & Wilson, R.J. (2000). *Assessment and Learning: The ICE approach*. Winnipeg, MA: Portage and Main Press.

Fostaty Young, S. (2005). Teaching, learning and assessment in higher education: Using ICE to improve student learning. *Proceedings of the Improving Student Learning Symposium,* London, UK, *13*, 105-115.

Chapter 5: How to Think Like a Geoscientist: Using ICE to Support Critical and Creative Inquiry

Figure 1. Part A of the Rubric

Part A of the rubric used for the Study Site Assignment (SSA). The rubric is comprised of 4 columns. The first column lists the focus of this rubric: the

description of the study site. Each subsequent column describes this task when considering Ideas, Connections, and Extensions.

Ideas:

- Accurately locate and describes the chosen study site
- Compiles the illustrations and associated text
- Assembles a list of reasons for the chosen site

Connections:

- Synthesizes text and illustrations to highlight relationships
- Integrates a variety of dimensions and scales

Extensions:

- Proposes a compelling rationale and justification for choosing their site
- Uses spatial thinking to communicate the significate between identified relationships

Figure 2. Part B of the Rubric

Part B of the rubric used for the Study Site Assignment (SSA). The rubric is comprised of 4 columns. The first column lists the focus of this rubric: Composition, Structure, and Processes. Each subsequent column describes this task when considering Ideas, Connections, and Extensions.

Ideas:

- Accurately describe and effectively communicates the type of rock at the chosen study site.
- Identify and label the correct location in the classification scheme and rock cycle.
- Sources are cited according to APA style

Connections:

- Synthesize text and visuals to articulate relationships.
- Applies systems thinking to illustrate the context of the chosen rock to the rock cycle

Extensions:

- Justifies, thorough writing, the classification of the rock type.
- Creates a unique adaptation of the rock cycle that provides context for the chosen rock.
- Systems thinking is used to defend the interconnected nature of the relationships within the Earth System

Figure 3. Part C of the Rubric

Part C of the rubric used for the Study Site Assignment (SSA). The rubric is comprised of 4 columns. The first column lists the focus of this rubric: Age of the Material. Each subsequent column describes this task when considering Ideas, Connections, and Extensions.

Ideas:

- Name and numerically describe the age of your rock.
- Accurately place the age of your rock in the geologic time scale.
- Sources are cited according to APA style

Connections:

- Synthesizes text and visuals to articulate relationships.
- Applies temporal thinking to illustrate the context of the chosen rock to the geologic timescale

Extensions:

- Justifies, through writing, the placement of your rock in the geologic timescale.

- Create a unique adaptation of the geologic timescale that provides context for your chosen rock.
- Temporal thinking is used to defend the interconnected relationships with Earth's history

Chapter 6: Shine the Light: Using the ICE framework in Sociology Courses to see the "Big Picture"

Figure 1: Course Design Model and Constructive Alignment, adopted from Aligning learning outcomes, assessment, and teaching methods in Ellis, D. (2007). Teaching Excellence Academy workshop. University of Waterloo, Canada.

A triangle diagram. At the top, Intended Learning Outcomes. Lower left corner, Teaching and Learning Activities. Lower right corner, Formative and Summative Assessments. Double headed arrows depict Methods that connect each point with another. At the centre of the triangle it reads, Concepts (Content: Knowledge, Skills and Values).

Figure 2: ICE Rubric to Measure Communication and Critical Thinking Skills

A four-column rubric. The first column identifies the elements to be assessed in this assignment, which include communication skills and critical thinking skills. The following three columns are dedicated to describing these skills in relation to learning at the Ideas phase, the Connections phase, and the Extensions phase.

The instructor describes communication and critical thinking at the Ideas phase in the following ways. When a statement is proceeded by the letter "C" this indicates a

measurement of communication skills. The letters "CT" indicate a measurement of critical thinking skills.

- Accurately identifies the purpose of the paper and/or the author's argument and/or author's research questions (C)
- Accurately identifies the paper's theoretical perspective (C)
- Accurately identifies the paper's methodological approach (C)
- Accurately identifies the paper's findings/ conclusions (C)

The instructor describes communication and critical thinking at the Connections phase in the following ways.

- Draws attention to/analyze the relationship among articles on a similar topic (i.e., author's arguments, theoretical perspective, methodology, findings, etc.) (C & CT)
- Draws attention to/analyze the relationship among articles between different weekly topics (i.e., author's arguments, theoretical perspective, methodology, findings, etc.) (C & CT)
- Draws attention to connections between course articles and sociological concepts/perspectives/levels of analyses (C & CT)

The instructor describes communication and critical thinking at the Extensions phase in the following ways.

- Extrapolates relevant content from the paper(s) to other current events/ situations (C)
- Extrapolates relevant content from the paper(s) to mainstream media representations of a similar topic or social problem (C & CT)
- Evaluates relevant content from the paper(s) to other course topics/social problems (C & CT)

Figure 3: A Sample of an Academic Reading Review Table

A six-column table with an empty row below for student input. The columns read as follows, left-to-right: Author/Citation; Purpose, Statement, and Research Questions;

Background, Theory; Methodology, Methods; Results, Findings, Conclusion; Other e.g., Tensions, Debates, Limitations.

Figure 4: A Completed Sample of the Academic Reading Review Table

A six-column table. Each column has a heading as indicated in the Sample Academic Reading Review Table. Student information has been entered below the first five columns. This reads as follows:

Purpose, Statement, and Research Questions: The gendered organization of violence is part of a socially constructed set of values through which we recognize ourselves, and each other.

Background, Theory: Poststructuralism

Methodology, Methods: Literature review and media case analysis

Results, Findings, Conclusion: Violence is a set of ideas and strategies that get put into practice in society in contextual and value-specific ways, for example, in operationalizing gender. Our meanings about gender define and limit who and how we can be violent.

Figure 4 Citation

Author/Citation: Naugler, Diane, 2017. Making Violence Remarkable: Reconsiderations of Everyday Gender Violences, Chapter 2 *Mapping Geographies of Violence*. Eds. Kitchin Dahringer, H.A. & Brittain, J.J. Fernwood Publishing, Halifax

Figure 5: Critical Media Assignment Description

A table with two headings and two columns outlines the assignment details and grade breakdown.

The first column lists the assignment details under the heading Critical Media and Topic Analysis, with a prompt for students to work in a group of 4 or 5 students:

- Pick a topic/week and find and agree on one relevant media source/event (within the last 5 years) related to the topic
- Identify ICE between the academic media literature and your media example in your written and oral analysis/presentation
- Oral group presentation of your collaborative analyses in class (within 20 mins) with a PowerPoint presentation and intentional teaching and learning activities to increase class participation, engagement & learning

The second column lists how students will earn their grade under the heading Grade Breakdown:

- 5% individual grade for outline submitted one week prior to presentation
- 10%individual grade for written analysis submitted one week after group presentation
- 10% group grade for knowledge mobilization presentation

Figure 6: Example of an Extension in the ICE Model Exploring Messages Across Different Forms of Media

A slide with regular body text and text in the center of the slide in a speech bubble. The first sentence on the slide reads, Theorizes the relationship between gender and violence (there is one!).

Then there are three examples of information derived from various sources of media. From a scholarly journal, "There is need to explicitly address the less than full overlap of the violence that is variously 'domestic', 'gender-based', and 'against women'. This includes consideration of violence that is gendered but not domestic." (Walby, Towers & Francis, 2014, 188).

From an episode of Full Frontal with Samantha Bee, ""Over the past few months, we have all discovered who is behind workplace harassment and it's literally thousands of men."

From a book, "...role violence (sexual harassment) plays in the production of normative gender"
(Naugler, 2017, 29).

Chapter 8: Patient Mentorship in Occupational Therapy Education: The Influence of ICE on Student Learning

Figure 3: OT 825 Journal Review Assessment Rubric

A rubric assessing the journal entry by Peter Harris, 2013.

The rubric has 4 columns and 5 rows. The top row is comprised of 4 headers: Reflection Components, followed by Ideas, Connections, Extensions.

The first column, Reflection Components, lists the following areas of assessment: Objective Level, Reactive Level, Interpretive Level, Decisional Level, and Written Journal.

The follow ratings can be selected when assessing Ideas.

Objective Level—Ideas: Describes basic information of the situation/experience (e.g., visit with a mentor; tutorial discussion themes). Use of one sensory descriptor. (e.g., describing in detail what the student observed in the setting in which the visit took place).

Reactive Level—Ideas: Identifies a feeling/emotion or reaction related to the experience/situation.

Interpretive Level—Ideas: Discusses the meaning and significance of the experience. Demonstrates understanding of the meaning of one's own experiences.

Decisional Level—Ideas: Discusses future implications for personal awareness and interactions.

Written Journal—Ideas: Names of mentors & students, as well as identifying data, have been omitted to ensure confidentiality

The follow ratings can be selected when assessing Connections. The teacher made two selections from this area of the rubric when assessing the sample journal entry. Each has been identified.

Objective Level—Connections: Provides a thorough description of the situation, using at least two sensory descriptors. Inclusion of events outside of the immediate course content—i.e., Campus accessibility, transportations system. Describes the context of the situation or experience.

Reactive Level—Connections: Describes previous memories or experiences that influence this reaction.

Interpretive Level—Connections: Teacher Selected Rating. Discusses the meaning and significance of the experience and relates this to previous experiences. Demonstrates understanding of the experiences of one's mentor, student partner and colleagues in 825.

Decisional Level—Connections: Discusses future implications for personal interactions and professional practice.

Written Journal—Connections: Teacher Selected Rating. Takes needs of the reader into account in the presentation of the information (i.e., bolding, subtitles, spacing). Material is clearly written and presented with professional terminology where appropriate.

The follow ratings can be selected when assessing Extensions. The teacher made three selections from this area of the rubric when assessing the sample journal entry. Each has been identified.

Objective Level—Extensions: Teacher selected rating. Describes the situation in detail, including multiple sensory descriptors. Situation/experience is described in relation to past experiences. Discusses both the personal and the macro-level environment (i.e., socio-political).

Reactive Level—Extensions: Teacher Selected Rating. Discusses personal reaction and relates this to the broader social environment.

Interpretive Level—Extensions: Discusses the meaning and significance of the

experience in relation to the broader social environment. Demonstrates understanding of the complexity of issues at multiple levels.

Decisional Level—Extensions: Teacher Selected Rating. Discusses future implications for personal interactions, professional practice, and health care provision. Discusses implications at a policy and socio-political level.

Written Journal—Extensions: Vocabulary selected articulates ideas and understanding of the profession. Overall appearance and content demonstrate attention to detail and an effort to produce a document that is personally and professionally relevant.

Chapter 9: Using the ICE Framework in a 2nd Year Research Methods Class

Figure 1. Using the ICE framework in a Social Science Rubric

A 3-column rubric structured on the ICE framework, for use in a Social Science course.

The first column identifies the 3 components of the ICE framework—Ideas, Connections, and Extensions. The middle column identifies tasks which are connected to Ideas, Connections, Extensions. The last column includes marks assigned to each task, for a total of 25 marks.

Ideas: 8 out of 25 marks

- Teach us about the method

Connections: 6 out of 25 marks

- Compare to another study that uses a similar method

Extensions: 3 out of 25 marks

- Imagine a study in which you would use this method to answer a research question of your own choosing.

The following two tasks are also evaluated: 4 out of 25 marks each

- Presentation quality
- Group participation

About the Authors

Sue Fostaty Young: Most recently Sue was the Director of the Centre for Teaching and Learning at Queen's University in Kingston, Ontario where she oversaw a wide range of programming to support post-secondary instructors' teaching development. Her program of research—learning-assessment-focused educational development—has earned her recognition across campus as *The ICE Queen*.

Meagan Troop has worked in the field of educational development for over a decade with experience in both college and university contexts. In her most recent role as the Manager of Educational Development at Sheridan, Meagan has collaborated with faculty, staff, and administrators to design and facilitate evidence-informed programs and initiatives that build teaching and learning capacity. Her research interests include creative pedagogies, transformative learning, educational leadership, and the scholarship of teaching and learning.

Jenn Stephenson: Jenn is a Professor in the Dan School of Drama and Music at Queen's University. Her current research (with co-investigator Mariah Horner) examines a recent trend towards audience participation in game-theatre hybrid performances where the audience become active co-creators in the experience. As a teacher of theatre history and dramatic literature, she is infamous among her students for her love of toasters.

Kip Pegley is a Professor in the Dan School of Drama and Music, Queen's University. He is the co-editor of *Music, Politics and Violence* (Wesleyan University Press, 2012), and, more recently, his work on sound and trauma has appeared in *Singing Death: Reflections on Music and Mortality* (Routledge, 2017), *Music and War in the United States* (Routledge, 2019), and *MUSICultures* (2019).

John Johnston: Currently, John Johnston is an instructor and teaching fellow in Earth and Environmental Sciences at the University of Waterloo, Ontario. As a passionate geoscience educator for more than two decades now, he has designed and taught more than twenty-five different courses at three universities and numerous professional workshops. John's research focuses on coastal geoscience and geoscience education, most recently creating learning frameworks uniting

students with extended reality experiences and three-dimensional geological models.

Mavis Morton: Mavis is an Associate Professor in the department of Sociology and Anthropology and teaches in the Criminal Justice and Public Policy undergraduate program and the Social Practice and Transformational Change graduate program at the University of Guelph in Guelph (UOG), Ontario. Currently, Mavis is the Director of the First Year Seminar (FYS) program where she works with instructors to help design interdisciplinary courses for first-year students that fit the FYS program criteria. Mavis is a member of numerous teaching and learning committees at the UOG. Mavis is a critical community-engaged scholar, and her program of research includes both collaborative research with community partners on violence against women and other social justice issues and often includes working with and training students as researchers on the scholarship of teaching and learning (SoTL) research projects.

Christa Bracci is an adjunct professor at Queen's University Faculty of Law, where she teaches and develops courses in legal research, writing, and practice skills. Her research interests include skills pedagogy and curriculum design. She has worked and practiced in a range of environments including in government, and in both boutique and large national law firms. Christa is a member of the Bar of Ontario.

Anne O'Riordan: After a career in healthcare spanning four decades, as an occupational therapist and educator at Queen's University, Anne traded academia for the front lines in healthcare. The patient mentors with whom she worked, along with her own journey as a patient and caregiver, compelled her to become a Patient Advisor at Kingston Health Sciences Centre.

Valerie Michaelson is an Assistant Professor in the Department of Health Sciences at Brock University. Her research focuses on health equity and the social dimensions of the health of children. Social justice and human rights are core to her work. She is passionate about teaching students the critical thinking skills they will need to engage productively with the critical equity issues they will face as health professionals.

Kanonhsyonne Jan Hill is the Associate Vice-Principal (Indigenous Initiatives and Reconciliation) at Queen's University. She leads the Office of Indigenous Initiatives, providing strategic support and leadership to oversee the university-wide

implementation of the recommendations from the Queen's TRC Task Force Report. Jan is Mohawk, Turtle Clan, and a Clan Mother at Tyendinaga Mohawk Territory.

Shayna Watson is a family physician in the Department of Family Medicine, and Regional Clerkship Director, at Queen's University in Kingston, Ontario. Her non-clinical work and scholarly interests include community-based medical education, longitudinal integrated clerkships, EDIIA (Equity, Diversity, Inclusion, Indigenization, and Accessibility), and reflective practice.

Back Cover

Teaching, Learning & Assessment Across Disciplines: ICE Stories is the end product of a collaboration of generous post-secondary educators whose practices have been influenced by the ICE model. Each author contributed a chapter based on their own conceptualization of the model and the ways they've used it in their classrooms. They begin by setting the context, either conceptual or instructional, in ways that are likely to resonate with readers' own teaching and learning experiences. Authors share practical details of their instructional and assessment strategies and the ways that the ICE model has shaped their and their students' thinking and learning.

This volume isn't merely a compilation of cases. It represents a process of mutually supportive reciprocal review that the contributors adopted that saw them meet regularly over time to discuss one another's conceptions of ICE, adaptations, and applications. They read one another's chapters, provided peer-to-peer feedback, and learned from one another. Throughout the process, they served as generous, caring, critical friends, forming a community of inquiry.

We acknowledge and appreciate the thoughtful insights provided by the anonymous peer reviewers who shared their time and expertise. Your support was invaluable.

Sue Fostaty Young and Meagan Troop