Janice Miller-Young, UNIVERSITY OF ALBERTA, jmilleryoung@ualberta.ca
Jeffrey W. Paul, UNIVERSITY OF MANITOBA
Renato B. Rodrigues, UNIVERSITY OF MANITOBA, renato.bezerra@umanitoba.ca
Jillian Seniuk Cicek, UNIVERSITY OF MANITOBA, jillian.seniukcicek@umanitoba.ca

A Systems-Inspired Taxonomy of SoTL Research: Increasing the Accessibility and Visibility of this Heterogeneous Field

ABSTRACT

The scholarship of teaching and learning (SoTL) is a vast, multi-epistemic field which can be challenging for new and experienced scholars to navigate. This paper introduces a systems-inspired taxonomy of SoTL designed to enhance accessibility, visibility, and knowledge organization within the field. Drawing from an iterative and extensive process involving a literature review, thematic coding of published SoTL inquiries from eight different journals, and international community consultations, the resulting taxonomy in its current form has six trees or "dimensions." These include who is being studied, what aspects of learning are investigated, how learning is supported, where and when studies take place, why students learn, and the inquiry approaches used. The taxonomy serves multiple purposes: providing researchers with a structured way to situate their work, guiding literature and scoping reviews, and improving the discoverability of SoTL studies through more deliberate keyword selection. By adopting a systems-thinking perspective, this taxonomy balances structure with flexibility, offering a navigational tool rather than a rigid classification scheme. It is intended to be descriptive, rather than prescriptive, and should be regularly updated through ongoing community input and engagement in order to ensure it remains reflective of emerging research and practice in the field.

KEYWORDS

student learning, teaching, research, context, higher education, knowledge organization

INTRODUCTION

SoTL is a broad, heterogeneous field of practice with a diversity of definitions and methodologies for investigating student learning in higher education. This can make it a difficult space for new and experienced scholars to navigate. For those new to SoTL, a well-constructed map can serve as an entry point, offering a structured overview of the breadth and depth of existing practice. For experienced researchers, it can provide a roadmap that helps connect their scholarship to previous work, as well as revealing potential gaps in existing research. As Chick, Nowell, and Lenart (2019) wrote, "the field needs . . . rigorous inventory taking and analysis that maps the field to show the highly traveled questions, topics, methods, and areas where more work needs to be done" (187). By making visible the structure and topics of a field, a map can enhance both individual scholarship and collective knowledge-building efforts.

There are many approaches to mapping a field. Systematic reviews synthesize evidence on a well-defined research question by evaluating existing studies (e.g., Mercer-Mapstone et al. 2017). Bibliometric analyses track citation patterns and co-authorship networks, providing insights into the intellectual structure of a field (e.g., Ertem and Aypay 2023). Scoping reviews, such as the protocol proposed by Chick, Nowell, and Lenart (2019)—though, to our knowledge, the study was not completed—aim to chart the breadth of research in a given domain. While there have been several published literature reviews of SoTL, few have identified the breadth of concepts or themes within the literature. For example, several reviews have focused on SoTL as a topic (Ertem and Aypay 2023; Tight 2018) rather than analyzing SoTL inquiries. Indeed, one recent review found that less than 25% of SoTL literature consisted of reports on SoTL inquiries (How 2020). Other reviews have focused on only one journal (Dobbins 2024). This article aims to fill that gap by offering a taxonomy of SoTL research based on existing literature. As SoTL encompasses a variety of genres (Miller-Young and Chick 2024a), such an inquiry requires scoping. This article focuses specifically on SoTL inquiries that examine student learning, whether through direct study or in partnership with students (Felten 2013).

Why a taxonomy

Practically, if one of the goals of scholarship is to disseminate, others must be able to find that knowledge. Though taxonomies originated in biology as a hierarchical classification scheme, they have been adopted in many fields as knowledge organization systems (Hedden 2010). The term taxonomy may be used informally, simply providing broad conceptual categorization, and it need not even be hierarchical. However, formalized hierarchical taxonomies are a tool to enable knowledge sharing and retrieval by providing an organizational system "to map the field and to communicate and connect research initiatives" (Finelli, Borrego, and Rasoulifar 2015). In application, they are often used to provide guidance for assigning keywords within a field of research. A good example of a taxonomy developed to formalize a "newer" field is found in Finelli, Borrego, and Rasoulifar (2015), who led a complex effort to develop the first taxonomy for engineering education research. Our goal is to provide a similar mapping of SoTL.

Formal taxonomies usually consist of controlled vocabulary and have a hierarchical, tree-like structure that shows relationships between terms (Hedden 2010). We recognize the risks of trying to develop both in a broad field like SoTL that is not only multidisciplinary but multi-paradigmatic (Yeo, Miller-Young, and Manarin 2023). Some scholars may find a taxonomy too reductionistic while others may find it useful but incomplete. Further, since some terms are used differently in varying discourses, not every scholar may agree with our categorizations. However, we believe a taxonomy will provide significant value by addressing the need for greater understanding of the landscape, by helping with the organization and discoverability of SoTL research, and by providing a heuristic for those new to the field. The objectives of this paper are to describe the development process of a taxonomy for SoTL research, to present an up-to-date version, and to discuss its potential applications and limitations.

Positionality statements

Janice: I have been involved in North American SoTL and ISSOTL communities for more than fifteen years. I conduct SoTL research ranging from studies of my own practice to studies of the SoTL landscape. I have written about my own feelings of disorientation when getting involved in SoTL, due in part to the low consensus nature of the field, yet I am uncomfortable with any definitions of SoTL that are too narrow or prescriptive. Thus, I view the taxonomy as being useful to provide a snapshot in time and to show a breadth of possible topics and approaches to explore. Situated in a country with a strong emphasis on Indigenous reconciliation, equity, diversity, and inclusion in education, I also

recognize the need for a taxonomy that reflects diverse cultural perspectives, although I am still learning in this area.

Jeff: I have worked and studied in several physics and technically-based fields. When I arrived in my engineering education research (EER) PhD program, I found many of my existing skills were not as easily transferable as they had been in my previous career trajectory. I was overwhelmed by EER's breadth and diversity, with learning the diverse, required ways of knowing, and with adopting an entirely new lexicon (e.g., epistemology, and axiology). Centred within this challenge was the need to accept that my world view had been primarily post-positivistic, but that there were other ways of knowing that have value. To understand this diversity, I tried to understand it all. This was a significant struggle, in part because some aspects of EER (like ways of knowing) seem to be in opposition with one another. Then, I discovered the EER Taxonomy (Finelli, Borrego, and Rasoulifar 2015). This taxonomy laid out the EER field in a manner that allowed me to understand both where my research interests lay and where they did not. Thus, when I started to engage in the multidisciplinary SoTL community, I found my struggles to understand SoTL paralleled my struggles to understand EER, and I sought out a SoTL Taxonomy. Not finding it, and with the encouragement of senior SoTL scholars, I started a collaborative project to create one.

Renato: I understand myself as a boundary spanner, working, studying, and researching across the disciplines of engineering, philosophy of technology, and education. My engagement with SoTL practices, literature, and community started indirectly through the Canadian engineering education community, which applies lessons and principles from SoTL in engineering contexts. Through my current position as an educational developer, I've since been engaging more directly with the SoTL literature and community in order to support educators across the university. Working on this paper, in collaboration with Jeff, has helped understand and familiarize myself with the plurality and richness of SoTL, without feeling intimidated by the many different ways in which SoTL research and practice can be approached. I hope the results of this work—the taxonomy—are able to provide this perspective to the reader as well.

Jill: I have been involved in engineering education since 2012, a field I serendipitously landed in after spending 10 years teaching high school and many years prior to that studying visual art, creative writing, English, and education. In one of my research areas, I explore the development of engineering education as a field in Canada, with a particular interest in the interdisciplinary and boundary experiences for scholars working in the field. Jeff became interested in exploring these same areas in the SoTL space and invited me to take this journey with him.

METHODOLOGY

We followed the guidance provided by Hedden (2010) to develop the SoTL Taxonomy. Hedden emphasizes the value of taxonomies for metadata and indexing of articles. She encourages taxonomy developers to immerse themselves in the literature of the field and collaborate with subject matter experts in order to refine and clarify the terms and categorization used within the taxonomy. We conducted both these steps with an interactive and cyclical approach, where the immersion in the literature informed the collaboration with experts, and the collaboration helped us find and interpret the literature.

Immersion

For the first stage of immersion, Jeff, Renato, and Jill conducted a literature review of SoTL literature to map and identify the ways in which scholars define SoTL inquiry. Being relatively new to the field, this was an important step to ensure we developed our taxonomy based on the literature

rather than our own perceptions. We searched for systematic literature reviews, frameworks, and models that aimed at defining, structuring, or organizing the field. We initially searched for both formally published literature and informally published literature (e.g., an informal summary published at Illinois State University and on the ISSOTL website). After reviewing the initial findings, we continued our search using snowball techniques by looking at the reference lists of the discovered literature, as well as using Google Scholar and Connected Papers (https://www.connectedpapers.com) to identify related publications. Our final inclusion criteria were that the source be a peer-reviewed paper, that it be written for a multidisciplinary audience, and that it should provide a model, framework, or definition of SoTL inquiry. Our list comprised 14 articles up to 2022 (Table 1)[1]. These articles allowed us to gain an overarching understanding of the current characteristics, purposes, identities, and nature of SoTL.

Next, Jeff, Renato, and Jill conducted a thematic analysis (Braun and Clarke 2006) of these articles in order to identify key topics and concepts covered by the papers and high-level themes that connected them to serve as the baseline of our proposed SoTL taxonomy. As Braun and Clarke (2006) state, thematic analysis is an approach (not a method) that provides structure but maintains the rich detail of source data. Though Braun and Clarke (2006) lay out six phases (e.g., familiarizing oneself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report), they are quick to note that these phases should not be conducted linearly but rather recursively. In addition, they state that thematic analysis can be deductive or inductive. This research follows an inductive approach. Three trees captured the key aspects of SoTL according to these articles: what is the topic that is being investigated?, where is this investigation taking place?, and how is this research being conducted?

Jeff proposed the initial branches and sub-branches, which were then independently reviewed and revised by the other two authors using the same methodology described above. Specifically, this included reviewing aspects of selected taxonomies developed by other authors (e.g., Finelli, Borrego, and Rasoulifar 2015), applying our own understandings gained from our immersion in the SoTL literature, and consulting with practitioners and experts, as described in the next section.

Collaboration

Concurrently with conducting the below analysis, we collaborated with practitioners and experts in the field. During the immersion phase, we engaged with authors and editors of *Becoming a SoTL Scholar* (Miller-Young and Chick 2024b) for feedback on the developing taxonomy. After the first draft, we presented our draft taxonomy at the ISSOTL 2022 conference and incorporated feedback, particularly by adding details at the sub-branch level. At this stage, we published a preliminary version of the taxonomy (Paul, Cicek, and Rodrigues 2024).

Table 1. Articles which formed the core of the meta-analysis, conducted to build the initial version of the taxonomy during the immersion phases

Author(s)	Method/goal	Summary
Hutchings 2000	Described four types of SoTL questions	● What works (evidence of effectiveness) ● What is (descriptions of practice) ● What could be (visions of the possible) ● New conceptual frameworks
Trigwell et al. 2000	Phenomenography study, which developed five categories of description of approaches to scholarship of teaching. Note: this article uses the historical term "scholarship of teaching" versus the current terminology of "scholarship of teaching and learning"	● The scholarship of teaching is about knowing the literature on teaching by collecting and reading that literature. ● Scholarship of teaching is about improving teaching by collecting and reading the literature on teaching. ● Scholarship of teaching is about improving student learning by investigating the learning of one's own students and one's own teaching. ● Scholarship of teaching is about improving one's own students' learning by knowing and relating the literature on teaching and learning to discipline-specific literature and knowledge. ● The scholarship of teaching is about improving student learning within the discipline generally, by collecting and communicating results of one's own work on teaching and learning within the discipline.
Mettetal 2002	The components of classroom action research, which form much of the basis of many SoTL initiatives.	● Background information ● Methods ● Results ● Reflection ● Presentation
Felten 2013	Lists five principles of good SoTL practice.	● Inquiry focused on student learning ● Grounded in context ● Methodologically sound ● Conducted in partnership with students ● Appropriately public
Hubball and Clarke 2010	A review of the methodological approaches used in SoTL. The framework is particularly relevant for comparing these methods.	● SoTL research context ● Central SoTL research questions ● Methodological approach ● Data collection methods ● General outcomes

Author(s)	Method/goal	Summary
Finelli, Borrego, and Rasoulifar 2015	A formalized taxonomy for engineering education research with 14 trees and multiple branches within each.	● Assessment ● Design ● Diversity ● Educational level ● Education setting ● Educational technology ● Instruction ● Outcomes ● Professional practice ● Recruitment and retention ● Related fields ● Research approach ● Theoretical frameworks ● Teams
Miller-Young and Yeo 2015	Developed a two-dimensional framework that plots the learning theoretical framework versus methodological approach.	Learning theory categories ● Behaviourism ● Cognitivism ● Constructivism, ● Social constructivism ● Humanism Methodology ● Quantitative ● Qualitative (empirical) ● Naturalistic ● Interpretive ● Critical ● Postmodern
Kern et al. 2015	Summarized previous taxonomies to the Dimensions of Activities Related to Teaching (DART) model, which classifies how activities are shared (private or public) versus how activities are conducted (informal or systematic), resulting in four quadrants.	Dimensions of Activities Related to Teaching: ● Practice of teaching (private/informal) ● Scholarly teaching private/systematic ● Sharing about teaching (public/informal) ● Scholarship of teaching and learning (public/systematic)
Fanghanel et al. 2016	A systematic review of UK SoTL activities and policies, resulting in a two-dimensional model that references SoTL characteristics and SoTL levels.	Characteristics ● Individual SoTL practices ● Focus on discipline ● Role of institutional structures for recognition ● Role of institutional structures for capacity building ● Role of national and international context Levels ● Micro: academics and departments ● Meso: institution ● Macro: national and international frameworks and communities

Author(s)	Method/goal	Summary
Divan et al. 2017	Survey of research approaches. Focus was on the data collection instruments, but guiding questions provide taxonomy insights.	● How prevalent is quantitative research only, qualitative research only, or mixed methods research amongst empirical SoTL articles? ● What data do SoTL researchers commonly gather, and when and how do they collect and analyze these data? ● When mixed methods research is used, how are qualitative and quantitative approaches integrated and/or balanced within these articles?
Booth and Woollacott 2018	Created a conceptual framework describing the five domains of SoTL based on a literature review.	● Didactic domain ● Epistemic domain ● Interpersonal domain ● Moral/ethical domain ● Societal domain
How 2020	A systematic review of SoTL literature, resulting in five categories of SoTL activities.	● SoTL methodologies and approaches ● Conceptualizing and framing SoTL ● Institutional support for SoTL ● Applied SoTL research ● Teaching and learning strategies and tools
Chng and Mårtensson 2020	Discussion of non-North American SoTL.	● Much of the non-North American SoTL focuses on issues external to the classroom, such as systemic and sociocultural factors
Poole and Chick 2022	Categorized seven forms of SoTL introspection.	● Reflection on authors' teaching ● Reflection on student thinking ● Practitioner identity exploration ● Practitioner contextualization ● Field definition ● Assessment of the state of the field ● Scrutiny of SoTL as a community
Lofgreen 2023*	Created a conceptual framework for SoTL incorporating three relevant research paradigms.	● Positivism/normative ● Critical realism ● Interpretivism
Ertem and Aypay 2023*	Bibliometric analysis using the search terms "scholarship of teaching and learning" and "improvement of pedagogical practice."	● Most frequently cited authors ● Topical foci
Miller-Young 2025*	Provided an eight level embedded systems model focused on learning (based on Bhaskar's critical realism and Bronfenbrenner's ecological model of human development).	● Sub-individual (physical/chemical/biological) ● Individual (cognitive and emotional) ● Micro (psychosocial) ● Meso (functional roles) ● Exo (educational system) ● Macro (society) ● Mega (traditions and civilizations) ● Planetary (ecological and cosmological)

We added articles indicated with a * during the second immersion phase, which is described below.

Next iteration

In 2025, after receiving a detailed review of an initial manuscript by this journal's editor, we invited Janice to help update the literature review and taxonomy and to collaborate on the revision of this manuscript, ensuring that the taxonomy remains current and reflective of the evolving SoTL landscape. Janice has expertise in a wide range of methodologies for SoTL research as well as having been engaged in a variety of multidisciplinary SoTL communities. Janice conducted another literature review of models presented in the literature (adding three articles to Table 1), and of websites such as ISSOTL's. We noted that ISSOTL, as part of its Grand Challenges, is encouraging SoTL practitioners to explore "learning as an ecological process rather than an individual cognitive one" (Grand Challenge #3, Scharff et al. 2023). This guided our work, encouraging us to embrace a systems-perspective. Janice also conducted a thematic analysis of 435 articles from 2023–2024 (Table 2) in order to identify new branches and sub-branches for the taxonomy. At this point, we felt that we reached saturation. This new analysis resulted in several new trees, resulting in an updated taxonomy organized by the questions: who is being studied?, what aspect of student learning is being investigated?, how do we help them learn?, where and when is the study situated?, why do (we think) student(s) learn?, and what is the inquiry approach? These re-organized branches and sub-branches align with the embedded systems model presented in Miller-Young (2025)[2]. After developing an initial updated version of the taxonomy, Janice discussed the changes and additions with Renato and Jill until we reached consensus [3].

Table 2. Journal articles (empirical articles focused primarily on students), that were reviewed for the updated taxonomy development.

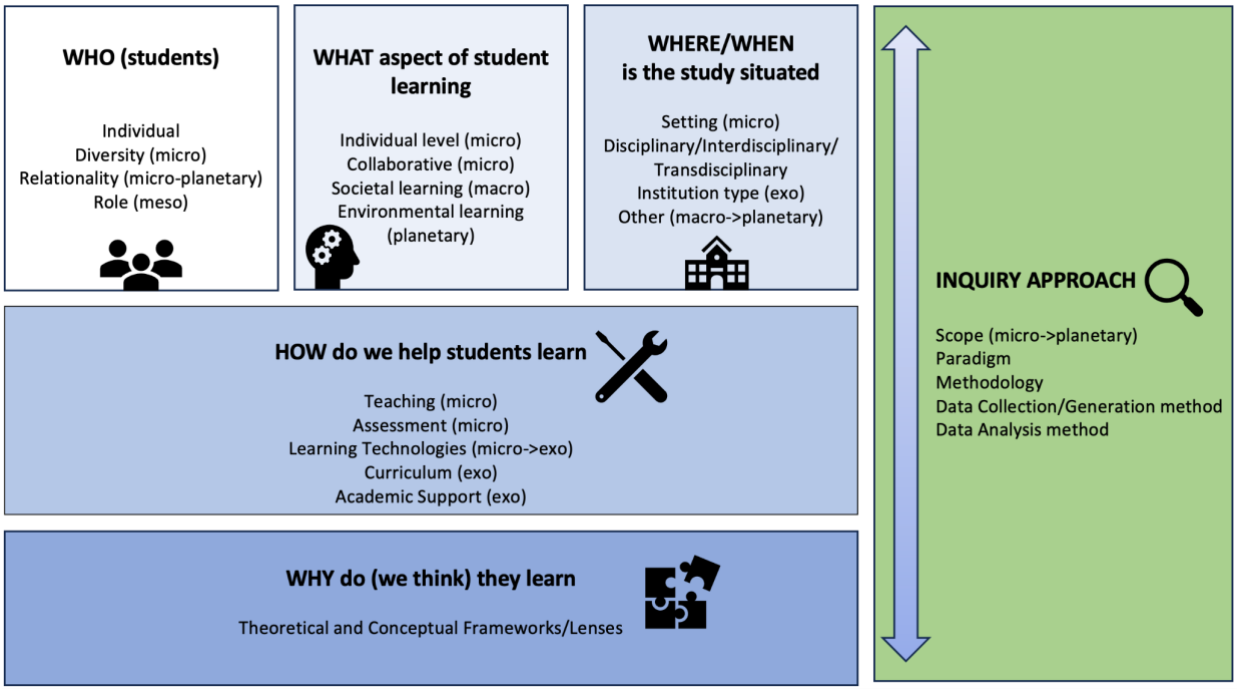
Journal and where it is based	Year: Number of articles
The Asian Journal of the Scholarship of Teaching and Learning (National University of Singapore)	2023: 5 2024: not yet available
The Canadian Journal for the Scholarship of Teaching and Learning (Society for Teaching and Learning in Higher Education, Canada)	2023: 22 2024: 36
College Teaching (Taylor & Francis)	2023: 23 2024: 32
International Journal for the Scholarship of Teaching and Learning (Georgia Southern University, United States)	2023: 21 2024: 15
Journal of University Teaching and Learning Practice (Australia)	2023: 62 2024: 46
Scholarship of Teaching and Learning in the South (University of Johannesburg, South Africa)	2023: 11 2024: 20
Teaching & Learning Inquiry (University of Calgary, Canada)	2023: 13 2024: 22
Teaching in Higher Education	2023: 50

(Taylor & Francis)	2024: 57
Total	435

The SoTL taxonomy 2025

In Figure 1, we present the six dimensions of the SoTL taxonomy. It begins with the focus of the study—students and specific aspects of their learning (who and what)—followed by the study's context (where and when), all underpinned by how educators support their learning. This is further grounded in the theoretical or conceptual understanding of why learning occurs. Finally, the inquiry approach links all aspects of the study. We have also indicated how each sub-branch relates to the eight level embedded systems model described by Miller-Young (2025). Next, we provide a description of each dimension by its branches and sub-branches in Table 3; branches and sub-branches added in 2025 are shown in italics.

Figure 1. SoTL taxonomy dimensions and major branches



The first dimension of the taxonomy focuses on whose learning is being investigated. Within this category, we found four branches, based on students' level of study, demographics, role, and relationships:

Table 3.1. The "who" dimension: Students

Individual	**Role (meso level)**	**Students' relationships (micro-> planetary level)**
● Student level o Undergraduate o Graduate **Diversity (micro level)** ● *Student demographics* o Rural/domestic/ international o Religion o *Underrepresented groups* ▪ Sexual orientation ▪ Gender ▪ Ethnicity/geographic background ▪ Physical disability ▪ *Neurodiversity* ▪ Socio-economic status o *Nontraditional students* ▪ *Age* ▪ *First-generation* ▪ *Different first language* ▪ *Veterans* ▪ *Prisoners*	● Learner ● Teaching assistant ● *Research assistant/partner* ● Tutor ● Mentor	o *Inclusion/belonging* o *Social connectedness* o *Peer-peer relationships* o *Instructor–student relationships* o *TA–student relationships* o *Social interdependentness* o *Ecological togetherness*

The second dimension focuses on the studied aspect of student learning. We identified three branches: the individual level, psychosocial level, and macro (and beyond) levels.

Table 3.2. The "what" dimension: Student learning

Individual level	**Psychosocial learning (micro)**	**Ethics, civic, and socioecological learning (macro->planetary)**
● *Foundational learning and processes* o Conceptual learning ▪ Misconceptions ▪ Preconceptions o *Embodied learning* o *Metacognition* o *Learning bottlenecks* o *Language learning* o *Learning retention* o *Learning/study skills* o *Self-directed/regulated learning* ● Creative and analytical skills o *Creativity*	● Student agency in learning ● Disciplinary/professional identity ● Classroom seating preference ● Collaborative and Relational Learning o Teamwork/ collaboration skills ▪ Psychological safety o Interpersonal/ intercultural skills o Professional/ Interprofessional skills o Leadership skills o Negotiation skills	o *Ethics* o *Empathy* o *Respect for others* o *Civic engagement* o *Environmental/sustainability learning* o *Social justice/equity learning* o *Endogenous knowledge*

- *Critical thinking*
- *Critical reading*
- *Writing skills/transfer*
- *Visual thinking skills*
- *Design thinking*
- *Research skills*
- *Argumentation skills*
- *Oral presentation skills*
- *Haptic knowledge*
- *Digital literacy*
  - *Technological fluency*
  - *Critical AI literacy*

- Student attributes
  - Motivation
  - Engagement
  - Growth mindset
  - Autonomy/agency
  - Academic self-efficacy
    - Balance belief
  - Academic buoyancy/resilience/ persistence
  - Anxiety
  - Resourcefulness
  - Moral character
  - Honesty
    - Academic integrity
  - Responsibility
  - Respect
  - Modesty
  - Humility
  - Cohesiveness
  - Wellbeing
    - Mental
    - Physical
    - Spiritual
    - Academic-life balance
- Entrepreneurial mindset
- Student success
  - Retention/progression/ attrition
  - *High school to university transition*

- Collective intelligence
- Interdisciplinarity
- Indigenous knowledges

The third dimension focuses on the context of the investigation. Within this dimension, there are four branches, including the instructional setting, the disciplinary (or beyond) setting, the institution type, and other macro (or higher) influences:

Table 3.3. The "where and when" dimensions: context

Instructional setting	**Discipline/interdisciplinary/ transdisciplinary**	**Institution type (exo)**
● Course delivery mode o In-person o Virtual/online ▪ Synchronous ▪ Asynchronous ▪ MOOC o Blended o HyFlex o Emergency remote ● Experiential/ extracurricular o Lab o Field trip o Competitions/ tournaments o Undergraduate research o Conferences o Makerspace o Studio o Capstone experience o Work-integrated learning ▪ Practicum ▪ Co-op ▪ Internship ● *Student mobility experiences* o *Study abroad* ● *Supplemental instruction* o *Facilitated study groups*	● Can be categorized broadly (e.g., STEM, SoTL) ● or narrowly (e.g., fine arts, quantum physics)	● *Research-intensive university* ● *Undergraduate university* ● *College* ● *Polytechnic* **Other influences (macro -> planetary)** ● Sociocultural influences ○ Country/culture ○ Post-truth ● Conflict-affected contexts ● Natural disaster ○ COVID

The fourth dimension refers to what type of teaching strategy, pedagogy, or learning support(s) was provided in order to help the student(s) learn. We classified our findings into five branches:

Table 3.4. The "how" dimension: Teaching and other educational influences

Teaching (micro level)	**Assessment (micro level)**	**Learning technologies (micro -> exo)**
● Pedagogy o Active and experiential Learning ▪ Flipped classroom ▪ Problem-based learning	● Assessment approach o Self-assessment o *Flexible assessment* o *Specifications grading* o *Ungrading*	● *Immersive and interactive technologies (micro/meso)* o Simulation o Virtual reality o Augmented/extended reality

- *Team-based learning*
- Project-based learning
- Peer learning/instruction
- *Communal constructivism*
- *Inquiry/research-based learning*
- *Schema-based learning*
- *Design-based learning*
- *Speculative design*
- *Case-based learning*
- *Scenario-based learning*
- *Reflective pedagogy*
- *Pedagogy of failure*

o Equity-oriented and critical pedagogy
- *Community engaged/service learning*
- *Culturally responsive pedagogy*
- *Place/land-based learning*
- *Co-operatives for learning*
- *Engaged pedagogy*
- *Critical pedagogy*
- *Feminist pedagogy*
- *Pedagogy of care*
- *Contemplative pedagogy*
- *Arts/performance-based pedagogy*
- *Challenge-based pedagogy*
- *Pedagogy of discomfort*
- *Inclusive pedagogy*
  - *Trauma-informed pedagogy*
  - *Antiracist education*
  - *Storytelling*
- *Pedagogical partnerships*

- *Teaching techniques*
  - o *Interactive lecture*
  - o *Didactic class*
  - o *Scaffolding*
  - o *Co-creation*
  - o Peer evaluation
  - o Feedback
    - Summative
    - Formative
    - Dialogic
    - Ipsative processes
    - Rubric design
  - o Assessment models
    - Outcome-based learning
    - Competency-based learning
    - Mastery-based learning
    - *Authentic assessment*
    - *Assessment for inclusion*
- Assessment type
  - o *Attendance/ participation*
  - o Homework
  - o Assignment
  - o Quiz
  - o *Reflective journal or essay*
  - o Interactive oral assessment
  - o Discussion forums
  - o *Project*
  - o Exam
    - Practical examination
    - Open book
    - Standardized
    - Two-phase testing
    - *Structured oral examination*
  - o Question type
    - Multiple choice
    - Short answer
    - Long answer
  - o Student response system
  - o *Collaborative platform*
- Learning management (exo)
  - o Learning management system
  - o *Learning analytics*
- *Generative AI (exo)*
  - o *AI-augmented practice*
  - o *Automated feedback*

Curriculum (exo level)
- *Cumulative exposure*
- *Cyclical program review*
- *Curriculum renewal*
- *Learning progression*
- *Block model/courses*
- *Vertically integrated projects*
- *Decolonization/ indigenization*

Academic support (exo level)
- o Mentoring
- o Tutoring
- o Academic advising
- o Academic accommodations
- o Timetable/scheduling
- o Academic policies
- o Orientation
- o *Prior learning assessment*
- o Career advising/preparation

o *Imitation-style teaching* o *Ethical deliberation* o *Role play* o *Forum theatre* o *Journal club* o *Integration of authentic audiences* o *Providing unstructured breaks* o *Kinesthetic activities* o *Drawing exercises* o *Gamification* o *Mindfulness practice* o *Indigenous talking circles* o *Immersive learning practices* ● Instructional tools o *Course materials* o Slides/videos/ presentation tools o Course portfolio o Multimedia/film o *Social media* o *Open educational resources* ● Office hours		

In contrast to the previous iteration of the taxonomy, we found the use of sufficient theoretical and conceptual frameworks in the literature in order to justify a separate dimension. We classified them into ten branches: cognitive; constructivist; social constructivist; humanist; developmental; critical and justice-oriented; poststructural, posthuman, and decolonial; indigenous; educational technology and digital learning; and systems, complexity, and meta-theories.

Table 3.5. The "why" dimension: Theoretical/conceptual framework/lens

Cognitive (focus on individual mental processes)	**Constructivist (learning as an active, meaning-making process)**	**Humanist (focus on self-actualization and well-being)**
● Behaviorism ● Cognitivism o Metacognition o Cognitive load theory o Bloom's taxonomy o Threshold concepts o Expectancy-value theory o Self-agentic theory o Theory of planned behavior	o Variation theory of learning o Zone of proximal development o Embodied learning o Self-efficacy theory o Universal design for learning o Framework of student engagement o Transformative learning	o Self-determination theory o Care ethics theory o Affective theories ▪ Emotional learning o Universal wellbeing model **Developmental** o Adult learning o Internationalisation of the curriculum

	o Knowledge attitude practice model **Social constructivist (learning as social and cultural participation)** o Learning communities o Situated learning ▪ Communities of practice ▪ Value creation theory o Social network theory o Figured worlds theory o Potential space (Winnicott) o Boundary/border crossing o Academic literacies framework o Activity theory o Agency theory o Network theory o Cultural historical Activity theory o Experiential learning theories ▪ Experiential learning model o Role identity theory o Theory of social fields ▪ Institutional habitus o Theory of practice o Five A's theory of creativity	o Critical andragogy
Critical and justice-oriented (critique of power, equity, and knowledge production) o Hidden curriculum o Intersectionality o Critical social theory o Critical discursive psychology o Critical posthumanism o Model of students' multiple worlds o Social transformation theory o Epistemic injustice o Epistemic power o Participatory parity o Ecology of knowledge	**Poststructural, posthuman, and decolonial (challenging dominant discourses and redefining knowledge)** o (Feminist) new materialism o Affective economies o Diffractive analysis o Post-truth o Systemic functional linguistics o Sociomateriality o Poststructural theories ▪ Postcapitalist manifesto (Massumi) o Transhumanism	**Educational technology and digital learning (how digital tools shape learning)** o Connectivism o Mobile learning o Technology adoption model o Mediated learning model o Diffusion of innovation theory o Information architecture o Unified Theory of Acceptance and Use of Technology (UTAUT) o Theory of disruptive innovation o Integrative theoretical framework o Community of inquiry framework

o Transgressive social learning o Intercultural dialogue framework	o Postcolonial and decolonial theories ▪ Integral theory ▪ Post-Abyssal thinking **Indigenous knowledge systems** o *Ubuntu*	**Systems, complexity, and meta-theories** o Legitimation Code theory o Complexity theory o Meta-frameworks ▪ Systems/ ecological frameworks ● Complex adaptive (learning) systems ▪ Social analysis

Finally, the sixth dimension describes the variety of research approaches we found in the reviewed SoTL research literature. The five branches include the scope of investigation, paradigm, methodology, data collection/generation method, and data analysis method.

Table 3.6. The research approach

Scope of investigation (micro->planetary) ● Course/initiative ● Department/program ● Institutional ● Community ● Regional ● National ● International ● *Global/anthropocene* **Paradigm** ● Positivism ● *Neopositivism/normative* ● *Critical realism* ● *Interpretivism* ● *Transformative* ○ *Students as partners* ● *Indigenous* ○ *Ubuntu*	**Methodology** **Positivist->normative** ● *Experimental/quasi-experimental* ● *Structural equation modeling* ● *Correlational* ● *Survey* ● *Qualitative empirical* **Literature review** o Bibliometric analysis o Systematic o Scoping **Intermediate** ● Phenomenography ● Q-methodology ● Case study ● Design-based research ● Mixed methods o Sequential ▪ Explanatory ▪ Exploratory o Concurrent ● *Multimethod triangulation* **Interpretive**	**Data collection/generation method** ● Questionnaire ● Interviews o Structured o Semi-structured o *Think alouds* o *Decoding* o *Disrupting* ● Focus groups ● Concept maps ● Concept inventories ● Photovoice ● Course deliverables/assessments ● Grades ● Institutional feedback forms ● Classroom observation **Data analysis method** ● Descriptive/inferential statistics ● *Sentiment analysis* ● Template analysis ● Content analysis ● *(Reflexive) thematic analysis* ● *Constant comparison method* ● *Visual methods* ● *Multimodal methods* ● *Aetiological analysis*

	• Phenomenology • Grounded theory • Ethnography o Autoethnography • (Multimodal) Conversation analysis • Narrative inquiry • Poetic inquiry **Transformative** • Soft systems methodology • (Participatory) action research **Indigenous, decolonizing** • *Two-eyed seeing*	• *Membership categorization analysis* • *Close reading* • *Narrative analysis* • *Socratic method* • Discourse analysis • *Discursive analysis*

DISCUSSION

It's a challenge to organize a taxonomy based on such a large and diverse data set. We found it helpful to integrate systems thinking with a taxonomic structure to balance complexity with organization. However, we recognize that systems thinking and taxonomies operate on fundamentally different logics—one embraces emergence, interdependence, and fluid relationships, while the other imposes structure, classification, and hierarchy. Whereas taxonomies enforce discrete categories, systems thinking resists rigid boundaries, instead recognizing interactions across multiple levels. To reflect systems thinking in our taxonomy, we use the term "dimensions" rather than "trees" and depict major branches horizontally rather than vertically. Additionally, we present the titles of the major branches in grey and the columns of the tables as dotted to indicate their flexibility and permeability. Finally, we acknowledge the limitations of representing knowledge systems in fixed spatial models, whether as two-dimensional tables or as physical metaphors, like ecological systems.

Therefore, this SoTL taxonomy is systems-inspired, designed as a navigational tool that acknowledges the interdependence of educational phenomena. Within each dimension, there are branches that incorporate factors from the individual to the planetary level. We believe the taxonomy offers a necessary scaffolding for organizing the vast landscape of SoTL, making key dimensions visible while acknowledging the need for ongoing input and change. It provides a type of map, a shared language and structure for inquiry, and allows scholars to understand the breadth of the field and to locate themselves within it, drawing connections between their work and others. At the same time, any taxonomy risks oversimplifying the richness of teaching and learning by drawing lines where relationships flow. Therefore, we emphasize that it is not a fixed structure like a traditional taxonomy but an open system that is intended to represent the complexity of SoTL. However, while the structure of the taxonomy (Figure 1) might be somewhat subjective, the content of the branches and sub-branches represent common terms used to describe research inquiry (such as dimensions of learning, theories, methodologies, methods) and were drawn from our comprehensive review of the literature; therefore they provide a current snapshot of SoTL work focused on student learning. This supports another of the goals of ISSOTL: to grow the field by "expanding the questions asked, the aspects of learning it focuses on, and the methods by which it's conducted" (Grand Challenge #5, Scharff et al. 2023). As far as we know, this is the broadest review of the multidisciplinary SoTL literature conducted

to date in terms of the variety of questions being asked, topics and contexts of focus, methodologies, and methods. This is important to establish in order to address Grand Challenge #5.

Based on our updated literature review of eight higher education multidisciplinary teaching journals from around the world, we have shown that SoTL literature draws upon approaches and frameworks that go far beyond those within the learning sciences. The taxonomy also addresses influences on learning ranging from the individual to the planetary level. The only level missing in the reviewed journals is the sub-individual (physical/chemical/biological) level. This gap raises important questions. How might research from neuroscience, cognitive psychology, and embodied cognition bring new insights into learning? Could more interdisciplinary conversations help SoTL better account for the physiological and biochemical dimensions of student engagement, such as the roles of neuroplasticity or stress? At the same time, the planetary level is becoming harder to ignore. Climate change and geopolitical shifts are no longer peripheral concerns but pressing realities. As climate-related disasters and resource scarcity disrupt institutions and students alike, SoTL must continue to address how environmental sustainability, resilience, and climate justice intersect with learning. Likewise, geopolitical forces may reshape student mobility, equity, and access. A truly expansive SoTL must not only acknowledge these realities but actively engage with these contexts and their implications.

One of the more immediate applications of the taxonomy presented in this article is to help authors assign keywords when sharing their work. The proper choice of keywords to describe one's work improves its visibility, because it enables those interested in the topic to find it more easily, strengthening the knowledge in the field by connecting new work to existing work. Unfortunately, journal and conference guidelines are often vague or varied, leaving authors with little guidance (e.g., Table 4).

Table 4. Summary of keyword suggestions from SoTL journals

The Asian Journal for the Scholarship of Teaching and Learning	We found no public guidelines.
The Canadian Journal for the Scholarship of Teaching and Learning	We found no public guidelines.
College Teaching	Should contain between three and five keywords . . . Think of them as the labels for your article . . . Put yourself in the mindset of someone searching for articles on your topic, what words or phrases would you enter?
International Journal for the Scholarship of Teaching and Learning	Keywords for the article (4–6)
Journal of the Scholarship of Teaching and Learning	Authors should use keywords that are helpful in the description of their articles. Common words found in the journal name, or their title article are not helpful.
Journal of University Teaching and Learning Practice	A maximum of five keywords that differentiate the paper and maximize search engine results . . . Keywords should represent the content of your manuscript and be specific to the discipline.
Scholarship of Teaching and Learning in the South	At least five keywords relating to the field of study.
Teaching and Learning Inquiry	Three to five keywords or phrases . . . List in order of importance, such as the following: phenomenology, higher education, methodology, lived experience. Please do not include SoTL or scholarship of teaching and learning as keywords as these are already part of the journal metadata.

Teaching in Higher Education

Between five and six keywords.

Read through your paper and highlight any key terms or phrases that are most relevant to the focus of your work.

- Draw up a shortlist.
- Try searching with your keywords to make sure the results fit with your article and so you can see how useful they would be to others.
- Narrow down your keywords to make sure they are as accurate as possible.
- Review your final list and ask yourself, will these keywords be most effective at indexing my article online?

These inconsistencies highlight the need for guidance for keyword selection in SoTL research—a role that this taxonomy can play.

Taxonomies usually include guidelines for how many and what types of keywords to assign to a publication (Finelli, Borrego, and Rasoulifar 2015; Hedden 2010; Hubball and Poole 2011; Levy 2004). Our recommendations regarding keywords are as follows:

1. Choose, in order of relevance, four to six keywords with at least one answering the who, what, how, and where of student learning and the research approach. If a theoretical or conceptual framework is used, this should be a keyword as well. These major categories provide information about the characterizing aspects of published SoTL work, both classifying the research and making searching for the research simple and consistent.
2. Generally, choose keywords from lower-level terms in the sub-branches rather than higher-level terms. Lower-level terms are more specific, and we recommend selecting those that represent the most important aspects of the work. Though challenging, it is also necessary to find a balance between being specific and using a relatively common language, which will enable authors to connect their work to other related ones.
3. The specificity of the study, such as context, should be included in the title.
4. The title should contain different words than the keywords. For instance, Christie and Morris (2021) investigated the impact of assessed blogs as part of students' portfolios to increase student engagement. Even though "engagement" is an important aspect of the study, it is in the title and is already the lowest-level term in the taxonomy, so we would suggest using a higher-level keyword (i.e., student success) to connect it to related works in the literature. Another aspect worth highlighting is that studies, especially meta-analyses and systematic literature reviews, can have a focus that includes key terms found under the research context and research approach dimensions. Therefore, we encourage using the keywords that best describe the research focus, even if they are under a tree other than research focus.
5. Any keywords that the author cannot reasonably fit within the title or list of keywords should be used in the abstract. This is because many systematic review protocols often involve screening the article title, keywords, and abstract.

In addition to improving keyword selection and abstract preparation, taxonomies have significant potential to map the field of SoTL and identify underrepresented topics. However, we do not claim that our taxonomy is exhaustive. Rather, its branches and sub-branches provide a solid foundation that can inspire further development. Indeed, taxonomies should be updated regularly to align with evolving fields (Levy 2004). Changes can originate through suggestions offered by its users or through the analysis of how users utilize the taxonomy (Hedden 2010). These updates should include the addition of new terms, methodologies, or research foci, removal or merging of unused

ones, creation of sub-branches of overused high-level terms, clarifications of terminologies, and any other updates required to make the taxonomy more aligned with the field of knowledge it represents. Importantly, advances in generative artificial intelligence will likely influence how the taxonomy is used in keyword generation and literature reviews, making future reviews more comprehensive and systematic. Over time, if widely adopted, the taxonomy could streamline the process of identifying trends and gaps in SoTL research.

There are several limitations of a taxonomy which we must also address. First, taxonomies inherently reduce complexity by organizing knowledge into distinct categories. This can also obscure the nuances of individual studies and the influences between system levels. Also, some research may resist classification, especially those using emergent methodological approaches and/or writing styles that challenge traditional structures. Scholars must be mindful that this categorization is a tool, not an absolute framework. Third, like any classification system, the taxonomy reflects the perspectives and assumptions of its developers. Our author team comprises multi-epistemic backgrounds and experiences, but we all work in a field that heavily uses systems thinking, which likely influences how we find this framing to be useful. Finally, we have aimed to be as inclusive as possible in our literature review and taxonomy development, however we acknowledge that, despite our best intentions, some SoTL perspectives and topics may be underrepresented. We encourage others to use, provide feedback on, and expand the taxonomy going forward, enabling a dynamic open system that enhances, rather than inhibits, the field.

CONCLUSION

While the SoTL taxonomy presents significant benefits—providing an overview of the landscape, enhancing keyword selection and abstract preparation, facilitating connections across research, and supporting systematic literature reviews—it also has limitations that require careful consideration. By acknowledging these challenges and inviting an iterative, community-driven approach, the taxonomy may evolve as a valuable resource for SoTL scholars worldwide.

NOTES

1.) Three articles were added in the immersion phase in 2025.
2.) Many systems models use the terms “micro/meso/macro/mega” to describe embedded levels of systems. The terms, as used in this paper and Miller-Young (2025), centre the learner and prioritize learning processes and influences between levels, whereas the 4M framework, already commonly used in SoTL literature, is typically used to describe contexts for SoTL impact (Yeo, Miller-Young, and Manarin 2023).
3.) Sadly, at the time of this iteration, Jeff had passed away.

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AUTHOR BIOGRAPHIES

Janice Miller-Young (CAN) is a professor and the current director, experiential learning in the Faculty of Engineering at the University of Alberta. She teaches engineering design and conducts research on both student and faculty learning in higher education.

Jeffrey W. Paul (CAN) was enrolled as a PhD student in engineering education research at the University of Manitoba. He founded the SoTL Special Interest Group within the Canadian engineering education community and was enthusiastic about SoTL, research, and learning.

Renato B. Rodrigues (CAN) is a PhD candidate and an educational developer at the University of Manitoba. He merges engineering, philosophy, and education to research the social influences and impacts of technology, exploring the intersection of society and engineering.

Jillian Seniuk Cicek (CAN) is an associate professor in the Price Faculty of Engineering at the University of Manitoba. Her research explores the integration of Indigenous knowledges and worldviews with engineering curricula, and the development of engineering education research in Canada.

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