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Toward a Taxonomy: Insights from the 2025 CSCL paradigm building workshop

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Abstract

Computer-Supported Collaborative Learning (CSCL) has grown into a multidisciplinary field, yet persistent conceptual fragmentation limits cumulative knowledge building and newcomer entry. We frame paradigm formation in CSCL as a wicked problem that requires collective action. We report outcomes from the half-day *CSCL Paradigm-Building Workshop* at the ISLS conference 2025, preceded by anonymous online pre-workshop exchanges. Twenty participants and panel members from diverse disciplines and cultural backgrounds identified priority tensions around defining CSCL, integrating theories, and the future of the field. Across small-group and panel discussions, participants concluded that building a shared CSCL paradigm was neither feasible nor desirable. Participants highlighted weak communication across paradigms and the absence of shared descriptors for phenomena and analytic approaches. To counter the negative effects of co-existing paradigms, participants proposed a community-maintained CSCL taxonomy that tags and guides contributions along key dimensions of collaborative learning, instructional support, context, and epistemic stance. Such an approach will serve both the need to bridge paradigms and continuous community building. We close with a roadmap for collaboratively refining a proposed first draft of such a taxonomy and sustaining paradigm-building through ongoing workshops and community-based research.

Keywords Paradigm · Taxonomy · Workshop · Community · Collaboration

1 Introduction

Koschmann et al. (1996) introduced Computer-Supported Collaborative Learning (CSCL) as “an emerging paradigm”. Almost three decades later, Kaliisa et al. (2025) still see the field on a journey towards a shared identity, but the question of whether a CSCL paradigm exists remains unanswered. For instance, recent discussions and editorials highlight ongoing fragmentation (e.g., Wise & Schwarz, 2017; Baker & Reimann, 2024a, 2024b). This fragmentation limits cumulative knowledge building, hinders interdisciplinary

collaboration, poses challenges for novice researchers trying to navigate the field, and leads to gatekeeping issues (Pellmar & Eisenberg, 2000).

Kuhn (1970) explains fragmentation through the observation that “in the absence of a paradigm [...] all of the facts that could possibly pertain to the development of a given science are likely to seem equally relevant” (p. 15). Composed of “exemplars” of typical problem–solutions in the field, shared values, symbolic generalizations, and models, such paradigms help consolidate fields (Kuhn, 1970).

CSCL seems a particularly challenging environment for the emergence of a single paradigm: technology evolves rapidly, and CSCL research has a history of pioneering and embracing new technologies. Moreover, CSCL is rich in perspectives from a variety of contributing fields: theories from psychology, computer science, learning sciences, and sociology have expanded the field. However, this also increased its complexity (Ludvigsen et al., 2016a). Both factors (rapid technological development and CSCL’s theoretical diversity) directly oppose the evolutionary process of paradigm-forming in the Kuhnian (1970) sense. The transition from “pre- to post-paradigm period” is marked by “a number of schools compet[ing] for the domination of the field” (p. 178) initially, before divergences in a field disappear, “usually caused by the triumph of one of the pre-paradigm schools” (p. 17). Steady renewal of theories and a fast pace of technological innovation leave little room for an evolutionary process relying on ongoing debate of a dominant perspective in the field¹.

With natural evolution out of reach for a CSCL paradigm, and a variety of different fields present in CSCL, the emergence of a CSCL paradigm can be classified as a “wicked problem”, a type of problem particularly suited for collaboration, since it demands “common ground” and knowledge negotiation (van Bruggen et al. 2003, p. 35), both key processes of collaboration (Stahl, 2021). Furthermore, CSCL emphasizes collaboration as a vehicle for learning via the variety of perspectives in groups (Janssens et al., 2022). Collaborative cognitive load theory stresses the advantage of collaboration due to the availability of increased cognitive resources (knowledge and working memory capacity) compared to individuals (Kirschner et al., 2018). Hence, we conclude that collaborative work on this issue is well justified since (1) the problem is sufficiently complex, (2) the CSCL community is the appropriate group to address it, and (3) its expertise and collaborative capacities make significant outcomes likely.

Mobilizing a community, however, requires more than a theoretical proposal. It requires a mobilizing structure (McAdam et al., 1996) with individual incentives (Olson, 1965), flexible enough to allow potential actors to choose their degree of participation (Wenger, 2002). Half of this brief report’s authors thus planned and conducted a half-day workshop at the 2025 ISLS conference, embedded into similar measures (pre-workshop exchange and surveys) to attract and engage members of the CSCL community at different levels. The other half of this report’s authors are participants from the workshop, effectively making the collaborative writing process an onboarding mechanism into a core group of practice, while guaranteeing the faithful representation of each workshop discussion group.

We report on these findings as follows: firstly, we describe the context of previous efforts, before outlining this workshop’s design rationale and how it contributes to the overarching goal of collective paradigm building. Then, we detail the outcomes in four sections: the first section is dedicated to the pre-workshop exchange, and the remaining

¹ Especially as “a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.” (Planck, 1949)

three report on the three small group and panel discussions, leading to a rejection of a paradigm-building approach in favor of a collaborative taxonomy. Lastly, we conclude with recommendations and further actions along these results for the CSCL community.

2 Previous Workshops

The reported workshop is part of broader efforts within the CSCL community to address a lack of focus in the field. For instance, in the 2016 ICLS workshop by Cress and Penstein-Rosé (2016), the *Future of CSCL* symposium organized by Ludvigsen et al. (2016b), and, most recently, the *Reimagining and Advancing CSCL Research and Building CSCL Community workshop* at ISLS 2024 (Chan et al., 2024) have been held to identify current issues, e.g., a “lack of clarity regarding the focus in the field” (Damşa, 2024, workshop presentation) and potential future areas in the field, e.g., new theoretical challenges to conceptualize and analyze collaborative learning across its different time-related and cultural dimensions or how CSCL insights can transform into policies (Ludvigsen, 2016a, p. 261). Yet, despite these valuable efforts, no sustained community framework has emerged so far. Similarly, theoretical and methodological discussions through literature on the topic, such as those between Wise and Shaffer (2017), Rummel (2018), and Baker (2024), seem to have limited influence on collective directions.

3 Workshop Design

Motivation and Goals

Building on insights, suggestions, and identified shortcomings of previous efforts, design and execution of the workshop aimed to (1) accelerate and intensify discussions in the field on the fundamental question of field focus and identity through paradigm building, (2) serve simultaneously as a platform for community building to make the endeavor sustainable, and (3) raise further awareness in the community on the issue. Consequently, we set concrete output expectations for the workshop:

- (1) Prototype definitions of the domain’s main concepts.
- (2) A network of researchers to write a collaborative community paper synthesizing the established roadmap and methods identified to achieve a CSCL paradigm.

Participants and Procedure

The workshop was designed by ten researchers, of whom six are authors of this brief report. Sixteen researchers registered for the workshop; fourteen were present, of whom six are authors of this report. Six additional senior researchers were invited for the expert panel (see Fig. 1). There was no explicit requirement for workshop participation. Senior and junior researchers were involved during the design, on-site workshop activity, and collaborative paper writing. Represented disciplines were: Psychology (3), Learning Sciences (7), and



Fig. 1 Contributors. Green: original workshop designers; Blue: participants; Dark blue: participants who engaged in the pre-workshop exchange; Yellow: panelists; Red: ijCSCL reviewers.

Instructional Design (4). Participants joined the workshop from Germany (2), Switzerland (2), Japan (2), Spain (2), Norway, the United States, Turkey, Brazil, China, and Finland. Workshop participants were informed during and before the workshop about the organizers taking notes for this report, in accordance with the first author's institutional ethical guidelines.

As Fig. 1 illustrates, participants and panel members were initially invited to engage in an anonymous online exchange over four weeks prior to the on-site conference workshop on a shared document structured into tabs with initial questions. Participants could add their own topics or contribute to existing topics. The document featured a landing page with instructions on how to contribute. This exchange aimed to engage participants beyond the on-site workshop and generate topics from which participants could choose during the on-site event, effectively bringing previous reflections to accelerate discussions (goal 1). The four-hour on-site workshop started with an introduction to previous works, the results of a survey on the state of conceptual fragmentation in the community (Simon et al., 2025), and a summary of the topics from the pre-workshop activity (see Fig. 2). Participants then formed three groups of four to five participants for discussions on a pre-workshop topic of their choice (reported individually in Sections 5–7). All groups had access to the preworkshop document and documented their discussion in a shared slide deck. The second half of the workshop featured a discussion with the invited panel members. The panel discussions were initiated and supported with presentations from the previous small group discussions and are consequently reported as part of Sections 5–7. After the panel dissolved, participants were invited to reflect on the workshop and contribute to this brief report in the form of a collaborative writing activity, extending the workshop's discussion beyond the conference (goal 2) and increasing awareness of the broader CSCL community (goal 3). Beyond personal notes, the shared slide deck, created by the participants during the workshop, served alongside the participant's own memories as input for the collaborative paper writing effort and reconstruction of workshop discussions. All three small groups are represented among the authors.

4 Pre-Workshop Activity: Topic identification and initial discussions

Prior to the on-site workshop, participants were invited by mail to anonymously create or contribute to topics around paradigm and community building in a shared online document². Authors of the submission contributed to all eleven topics (see Fig. 2). Over the

² Project repository, available at <https://doi.org/10.17605/OSF.IO/6AR2Q>.

Preworkshop Activity Engagement

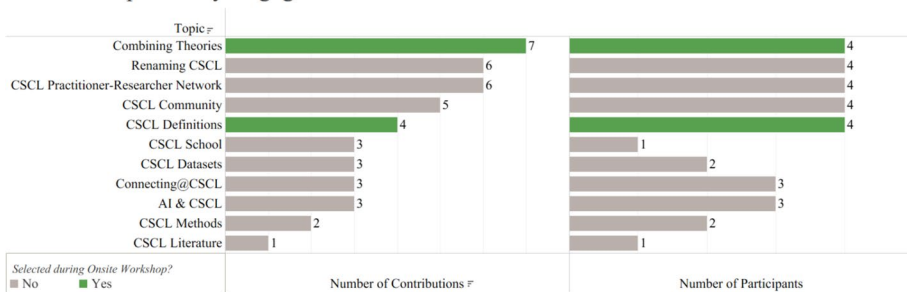


Fig. 2 Pre-workshop activity engagement per topic. Green: topics selected for discussion during the on-site workshop.

course of four weeks preceding the ISLS conference, these topics were discussed in varying intensity among 1 to 4 participants per topic. The topics “Combining Theories” and “CSCL Definitions” were later selected during the on-site workshop by participants for further discussion and presentation to the panel. The following subsections present the remaining online topics before we report dedicated discussions in groups around the two selected topics during the on-site workshop in the three following sections.

Topic: CSCL Community

Four participants highlighted the challenge of multidisciplinary in CSCL, leading to publications in a wide range of journals and conferences. Strict delimitation of the community would thus be difficult. The importance of a common, dedicated venue was mentioned. Furthermore, one user suggested the concept of “potential future community members” who could be identified through the criteria of disciplinary identity (Carlone & Johnson, 2007): knowledge, active performance, and recognition.

Topic: Renaming CSCL

Suggestions for alternative domain names ranged from “Technologically Enhanced Collaborative Learning” to “Postdigital Collaborative Learning”, to account for new technologies or to remove the technological qualifier entirely in favor of “Collaborative Learning Science”, to be more inclusive of non-tech studies.

Topic: A CSCL Researcher–Practitioner network

Four participants argued for a researcher–practitioner network through perceived challenges and opportunities: on the one hand, recruiting teachers for large-scale studies seems difficult. Inversely, practitioners seem interested in CSCL research-driven activities. Obstacles include diverse school regulations and complex research approval processes. Proposed solutions include streamlined multi-lab processes, agreements between institutions, schools, and institutional ethics committees for in-field research.

Other Topics

Artificial intelligence (AI) as a direct collaborator was critically discussed by two participants, pointing out the difficulty of AI fostering collaboration when involved directly. Participants, instead, leaned towards a supporting role of AI in data analysis, designing dynamic activities and offering support.

A conversation around *CSCL datasets* on a centralized repository took place, similar to Hugging Face³, enabling hypothesis testing across diverse analytical approaches and validation of models. Despite hurdles of privacy concerns and the context-specific nature of collaborative data, sharing anonymized transcripts and systematic literature review data is seen as crucial for transparency, reproducibility, and co-construction of knowledge.

Regarding *CSCL methods*, the two contributions emphasized the need for a centralized collection of recognized approaches. Participants recognized theory-driven learning analytics as a powerful and interpretable approach.

Based on Kuhn's (1970) idea that "the members of a scientific community see themselves and are seen by others as the [wo/]men uniquely responsible for the pursuit of a set of shared goals, including the training of their successors" (p. 177), the concept of a "CSCL school" was mentioned. Recognized standard literature and recurring collaborative research projects, ideally guided by senior scholars, were mentioned.

Finally, conversations touched upon the practicalities of connecting within the CSCL community, particularly at larger events like the ISLS conference. Visible identifiers (like bracelets), collaborative games for networking, alongside dedicated community meetings and conference apps, were mentioned.

5 Workshop Group Discussion: One Definition to Rule Them All

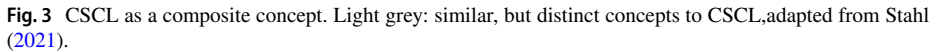
Finding a single definition for CSCL is inherently difficult. Stahl (2021) notes that "Previous attempts to circumscribe the field of CSCL have faltered; the target is so nebulous, controversial, disjointed, multi-dimensional and agonistic" (p. 21). The four participants in the pre-workshop highlighted the ambiguity of "the CS part", aligning with Stahl (2021) that CSCL is sometimes considered "educational technology", where technology is either the medium of communication or an additional platform supporting face-to-face collaboration. Attempts to define CSCL through the criteria of differentia (Landau, 1984, p. 153) lead to comparisons with CSCW (Computer-Supported Collaborative Work), where the goal of collaboration is the creation of a product instead of learning outcomes (see Fig. 3).

Learning itself, however, is subject to discussion in CSCL. Sfard (1998) opposes traditional metaphors of acquisition and participation, leading to different approaches in experimental design and theoretical grounding. Consequently, the seemingly composite multidimensionality (see Fig. 3) of CSCL and its naming concepts set the stage for the workshop debate.

Variety of Definitions

The four participants of the group noted that, despite the variety of definitions present in the literature, definitions are often left implicit in many CSCL publications. Consequently,

³ <https://huggingface.co/>



Panel members argued that various definitions might not be a weakness but a strength, representing the richness of perspectives in the field. Relatedly, panel members agreed that CSCL is not dogmatic, but in constant change, challenged and reshaped by researchers coming from different backgrounds. However, the issues of the variety of definitions (and, contrastingly, the lack of operational definitions in papers) remained unaddressed, with the potential of continued difficulties for novice researchers to decide whether and where their research fits CSCL.

Beyond the question of whether technology is a mediation tool for communication, an analysis tool to investigate collaboration, or an ecological lens, the word “computer” seemed obsolete to the four participants, given the ubiquity of educational technology, learning as a whole, and CSCL in particular, potentially increasing confusion for newcomers.

Similarly to the online exchange, where definitions and naming discussions were related, the on-site discussions around collaborative learning featured the role of definitions as an artefact of communication to other research communities: the alternative term of “collective” was proposed by a panel member, arguing that internally, the community could maintain the focus on “collaborative” learning while referring to it as “collective” when sharing work with other disciplines. Aligned with literature, such as Baker (2015), collective activities have societal implications, aimed at “satisfaction of a human basic need” (p. 7). They

neither necessarily imply a joint effort and shared understanding, present in collaboration nor even the intentional division of tasks occurring in a cooperative activity, as in the case of, for instance, the co-authoring of a “Wikipedia article” (p. 8). However, there can also be instances where collectivity includes collaborative or cooperative features. Thus, despite the distinction, when addressing broader audiences, using the term collective may help emphasize the societal aspect, while in CSCL, the term collaborative can maintain the focus on knowledge building and shared understanding.

Finally, participants observed that many CSCL definitions overlook the role of design, even though it is fundamental to how collaborative learning environments are created and studied. Recognizing design explicitly, participants argued, would strengthen the accuracy and completeness of CSCL definitions.

In summary, the group and panel members seemed eager to maintain diversity in defining the field, even in the face of the challenges this implies. Moreover, the domain name could be further broadened to “collective learning.” While potential challenges were not addressed, consensus was apparent on the nature of collaborative interactions concerning agents and scope.

6 Workshop Group Discussion: Diversity of CSCL Theories

While definitions are concise statements about the essence of a term (Landau, 1984, p. 163), theoretical terms rely on the context of their respective theories (Andreas, 2021). It is thus no coincidence that the variety of CSCL definitions is accompanied by a diversity of theories in the field. This has been evident during both online and on-site activities of the workshop. Five participants consequently explored the diversity of theoretical perspectives within CSCL research through perspective and dimensional diversity.

Perspective Diversity

The variety of fields in CSCL has been highlighted by Hmelo-Silver & Jeong (2021). The five participants identified the resulting variety of theories as a means to examine different aspects of the same situation of collaborative learning: for instance, studies may focus on social-network technologies to analyze students’ collaboration patterns or explore strategies for orchestrating and scaffolding collaborative learning processes. Specifically, some CSCL researchers adopt Actor-Network Theory (Latour, 2007), rooted in science and technology studies, to help capture the complex networks of people, tools, and interactions that shape collaborative learning processes. Drawing on Vygotsky’s (1978) sociocultural theory, other group members emphasized learning as a social process, mediated by cultural tools and collaborative dialogue. This interdisciplinary approach from psychology, education and sociology highlights how scaffolding supports cognitive development through shared interaction. Meanwhile, cognitive load theory (Sweller, 1988) offers an educational psychology framework for examining how instructional design and tools influence individual cognitive processing across both individual and group settings.

Together, these frameworks, without claiming exhaustiveness, illustrate the richness and diversity of theoretical perspectives in CSCL, reflecting the field’s interdisciplinary nature. The five participants outlined, however, the associated, ongoing challenge of assuring that these theories complement each other rather than compete. Taking on such a challenge has the potential to foster interdisciplinary connections within the community.

Dimensional Diversity

Another identified diversity of CSCL theories is where collaborative learning can be observed: (1) inside the learner, focusing on individual cognition and learning processes for which theories from psychology are frequently applied (e.g., information processing theory); (2) outside the learner, emphasizing the educational design of contexts, tools and resources, often grounded on pedagogical theories (e.g., constructionism, theory of group cognition); and (3) comprising both stances, exploring how dialogic networks of learners, tools, artifacts, and practices are formed and sustained, with socio-cultural theory and knowledge building being prominent examples of theories in this perspective.

This diversity aligns with another dimension: the level of analysis, ranging from the individual learner to small groups (intragroup interactions) and extending to larger communities and social media platforms (intergroup interactions). Recognizing these different dimensions is essential for developing a holistic vision of collaboration and underlines the issue of combining these different angles into one paradigm.

Connecting Theories

The layered nature of CSCL theories raises the question of how these theories can be meaningfully connected. Establishing connections is essential for building a more comprehensive understanding of the complex phenomenon that CSCL represents, and CSCL researchers are increasingly adopting multi-theory approaches (Hmelo-Silver & Jeong, 2021). Negotiating and setting the limits of the theories in CSCL to allow for holistic deductive reasoning across domains may present the emerging property that elevates CSCL to more than the sum of its disciplines. This has been exemplified through links between internal cognition and interactional meaning-making, as well as those bridging micro-level group dynamics with macro-level sociocultural transformations (Kaliisa et al., 2025). Moreover, Hakkarainen and Paavola (2009) combined different learning theories, demonstrating the value of holistic case analysis. The panel discussion acknowledged this diversity, similar to the variety in definitions, as a strength portrayed in literature. Rather than posing obstacles, the cross-fertilization of theories presents opportunities for breakthroughs in the field (Ludvigsen et al., 2021) and interfacing theories further helps identify and mediate contradictions between theories, both on the semantic and semiotic level.

While the group discussion identified dimensions for theory categorization, the approach would not provide a starting point for the endeavor of bridging them.

7 Workshop Group Discussion: A CSCL Taxonomy

The previous sections and discussions evidenced consensus across groups and the panel that, instead of aligning CSCL to a normal science with a single paradigm, the challenge is to maintain paradigm diversity in the field. Thus, a common definition in the traditional sense seems out of reach, and bridging the wide variety of complex theories is a challenging enterprise. The third workshop group, while initially choosing shared definitions as a topic, took a practical stance, considering the unifying element of CSCL the shared interest in understanding collaborative learning rather than a common theoretical approach. Consequently, the group discussed which tools the community lacked to do so.

Collaboration—A Challenge of Communication

If the strength of the field lies in the diversity of its paradigms, then the main challenge stems from communication across paradigms, not from the lack of a single paradigm. This challenge is exemplified through participants' experiences at CSCL venues, finding it difficult to resonate with talks about unfamiliar theoretical frameworks and methodologies, potentially hindering deeper engagement across paradigm boundaries and favoring siloed research within CSCL. As a result, CSCL may continue to produce substantial volumes of research, but without advancing a collective and comprehensive understanding of collaborative learning, slowing scientific progress and transfer into practice.

Taxonomies—A Tool for Collective Theoretical Communication

If the shared goal of the CSCL community is the collective investigation of the phenomenon of CSCL from multiple paradigms, then communication across paradigmatic boundaries must be facilitated to allow for the complementary cross-theoretical perspectives mentioned in the previous section.

Acknowledging the ambiguity of CSCL as a term itself, this group focused on developing a vision of ideal CSCL contributions: what does a CSCL study have to clearly communicate to readers who do not share a common paradigm? Group members identified, for instance, agent and temporal scope (small groups, collectives in punctual or more longitudinal setups), technological mediation (e.g., online, in-presence, hybrid, etc.), and task (e.g., knowledge building, problem-solving, co-design). Consequently, the group members concluded that a shared taxonomy for the field of CSCL could address this issue.

In literature, a taxonomy is commonly understood as a structured system for organizing and categorizing concepts according to a set of clearly defined dimensions or attributes. Originating in the biological sciences as a method for classifying living organisms (Ereshefsky, 2007), taxonomies have since been adopted across fields such as information systems, education, and the social sciences to create shared conceptual frameworks that support comparison, communication, and cumulative knowledge building. Unlike simple lists or hierarchical classifications, taxonomies often function as multidimensional frameworks or tagging systems that allow phenomena to be described along several independent variables, thereby enabling nuanced distinctions and cross-study alignment. Well-designed taxonomies serve as boundary objects that help communities navigate conceptual diversity, articulate assumptions, and relate heterogeneous approaches without forcing conceptual convergence. Taxonomies have been discussed in CSCL previously as a promising tool to mediate the problem of variety: Rummel (2018), for instance, proposed a taxonomy to find standardized descriptors for components of CSCL supports to "explore and map the landscape of CSCL support" (p. 124). It seems, however, that taxonomies have so far not been deployed on a community level.

Using standardized descriptors would further mitigate the issue of the "jingle-jangle fallacy" (i.e., using the same terms for different concepts, or different terms for the same concept; Hanfstingl et al., 2025). This would allow researchers to identify relevant studies across paradigms based on the phenomenon itself, regardless of the theoretical or methodological lens used.

Beyond better navigation of CSCL literature, a taxonomy including theoretical aspects would also help study authors to articulate the specific aspects of collaborative learning they are investigating more clearly, acting as a scaffold in the setup of CSCL studies and

experiments. Such a scaffold is not limited to theoretical foundations but may well encompass the deployed analysis and data collection methods to guide researchers. As such, it would further facilitate preregistrations of CSCL studies with sets of recognized research methods and initiatives from researchers to propose novel approaches that can then be discussed in the community. Such a tool would also facilitate and smooth review processes in journals and conferences, serving as a transparent “checklist” for what submissions are expected to contain, a practice present in other domains such as medicine.

Criteria and Challenges for a CSCL Taxonomy

Participants in this group developed initial prototypes for taxonomies, realizing that, compared to more traditional examples (e.g., in biology), a hierarchical system in which each taxon is only related to one superior category will limit flexibility, an issue given CSCL’s multiparadigm nature. Instead, group members proposed an initially structureless tagging system with a fixed set of variables to describe the variation of collaborative learning in a study (see Table 1). A variable in this context is meant as a placeholder with a set of possible, defined values. For instance, a variable could be an “activity goal” with possible values ranging from cognitive to social outcomes. Differences in these variables should have explanatory power; that is, they should be able to help understand the phenomenon better. Therefore, these variables should describe distinct aspects of the collaboration processes. Each variable should also have only a fixed (and small) number of potential values that are not too specific to keep it useful as a tool to group similar studies. Details on either binary or continuous variable values were not discussed.

Collaboratively building such a taxonomy, while significantly more achievable than a shared paradigm, still introduces a challenge of managing its evolution with parallel implementation. Group members proposed to start with an initial, core taxonomy based on a collaborative community effort, which, after this initial phase, would be extended and revised over time. Through a controlled process of revision, requests for change, involving discussions about which variables should be part of the taxonomy, the taxonomy could account for both the issue of evolving theories and technological innovation, as outlined in the introduction. Aligning with CSCL principles of diversity, we suggest drawing on information sciences for criteria to evaluate potentially competing proposals for a taxonomy (Nickerson et al., 2013; Szopinski et al., 2019; Unterkalmsteiner & Abdeen, 2023) and successful implementation of revision processes, for example, in decentralized software development projects to implement change and maintain compatibility across taxonomy versions.

8 Limitations

The reported workshop and its activities have a number of limitations. We stress that the reported findings and developments are not representative of the community. The pre-workshop activity, in particular, is the product of only ten participants, and, as literature and participants show, delimiting a community is non-trivial. Instead, the workshop should be considered as an effort within the CSCL community to engage its members in building common ground and communicative processes. The artefact of this workshop, a taxonomy draft, is still in an embryonic stage. It presents, at this stage, a provisional and community-dependent construct, and is intended to evolve through future iterations (e.g., workshops,

Table 1 A CSCL taxonomy draft.

Categories	Subcategory	Variables	Values	Description
Collaboration processes	Goal	Outcome	collaborate to learn, learn to collaborate	What is the rationale of collaboration?
		Goal type	knowledge co-construction, problem solving, design, no external goal (to the group)	What is the task that will be resolved through collaboration?
		Goal nature	explicit/undeclared	How clear/determined is the goal?
		Group size	dyads or the number of members per group	How big are the groups?
		Modality	face-to-face, video conference, chat-based, document exchange.	What is the modality of the task? What is the group working with?
		Timing	one time, over multiple instances	What is the timeline for collaboration (e.g., in a single class session, or e.g., in a project work for a whole semester)?
		Temporal coordination	synchronous, asynchronous	How is collaboration organized temporally?
		Number of turns	fixed number of turns, indefinite	How often do the collaborators take turns during the task (fixed: e.g. digital feedback or unlimited, e.g., direct face-to-face)?
		Goal of support	interaction, individual knowledge, ...	What is the supporting tool intended to do?
		Delivery agent	human, digital	Who delivers the support to the group (the type of support)?
	...	...	...	
CSCL support (Rummel, 2018)				

Table 1 (continued)

Categories	Subcategory	Variables	Values	Description
CSCL context		Familiarity of collaborators	strangers, known peers, established team	How familiar are the collaborators with each other?
		Domain	Psychology, Computer Science, ...	In what field/domain does collaboration happen?
	<i>Demographics</i>	Age	<Number>	Age of collaborators
		Gender	female, male, ...	
		...	...	
Methods and theories		Motivation	intrinsic extrinsic ...	How are collaborators motivated to perform the activities (e.g., mandatory course content or self-initiated)?
		Epistemological stance	social constructivist, critical-realist, positivist, ...	Which paradigm/epistemological stance is used by the researchers to describe and evaluate collaboration?
	<i>Method</i>	Quantitative	group comparison, correlational, ...	What quantitative statistical methods are used to evaluate processes and outcomes of collaboration?
		Qualitative	thematic analysis, conversation analysis, ...	What qualitative methods are used to investigate the process and outcomes of collaboration?
		Degree of stakeholder participation	co-design, participatory, ...	To what degree are stakeholders involved in developing tasks, design, and evaluation?

Delphi processes), rather than being interpreted as a stable or validated framework. This fact might, at the same time, bear potential to facilitate engagement and criticism of it, of which the reviewer's remarks on its current vagueness are illustrative. Furthermore, the theoretical framing through the works of Kuhn is one perspective among others (e.g., Fun-towicz and Ravetz's (1993) postnormal science). Finally, six of the authors are participants. While this ensures detailed accounts of in-group discussions and the use of a transitive memory, it also introduces bias, and the perspective of participants who are not authors might not be as represented as their authoring peers.

9 Conclusion

This paper reports on the process and findings of the 2025 CSCL workshop, *A CSCL Paradigm Building Workshop* at the ISLS annual conference. The workshop set out to (1) initiate the construction of a shared paradigm to counter perceived fallout from the copresence of multiple paradigms in CSCL (e.g., review processes perceived as unclear, fragmented research, etc.), hindering cumulative knowledge building, and (2) act as a community-building mechanism. The workshop was motivated by CSCL's multidisciplinary and the rapid acceleration of technological innovation (both on the experimental and analytical level), hindering traditional paradigm formation.

Moreover, on-site workshop activities at ISLS 2025, together with an anonymous pre-workshop exchange, underscored both the difficulty of this task and the participant's firm confession to maintain *different paradigms* in the field. The argument brought forward is two-fold. Firstly, the presence of multiple paradigms allows for the necessary analysis from different theories and domains to account for the complexity of CSCL phenomena and processes, spanning individual and collective processes, interactions between group members and their environment, as well as cognitive and social aspects of group learning. Secondly, the impracticality of a single, combined paradigm is rooted in what has been outlined in the introduction: an increasing pace of technological innovation and theoretical renewal.

Consequently, the initial workshop outcome of a joined, unique CSCL definition was abandoned in favor of drafting a community-maintained taxonomy to bridge and link paradigms. To address the aforementioned challenges, a future CSCL taxonomy must combine both representativeness and flexibility. *Representativeness* is necessary to ensure completeness and broad adoption. Secondly, while traditional taxonomies typically are based on a relatively stable and comprehensive set of entities, a CSCL taxonomy must account for constant change from involved domains and technology, while maintaining consistency with its different versions. This holds particularly in the context of transformative technologies such as generative artificial intelligence. Ensuring that the taxonomy remains extensible will require flexible processes of versioning, inclusive governance, ongoing revision, and careful attention to avoid privileging particular traditions.

To achieve uptake of the initiative among the community, we built and extended on the mobilizing structure of this workshop. Indeed, the workshop and its activities (pre-workshop online exchange, collaborative paper writing) have proven effective in spreading awareness on the issue, while identifying and accommodating members of the CSCL community in a collective working group behind a common goal. As Fig. 4 illustrates, the structure allows for mobility from peripheral to central roles in the process. Beyond participants becoming authors, one of the participants now leads the organization of the 2026 CSCL workshop, dedicated exclusively to the development and refinement of the

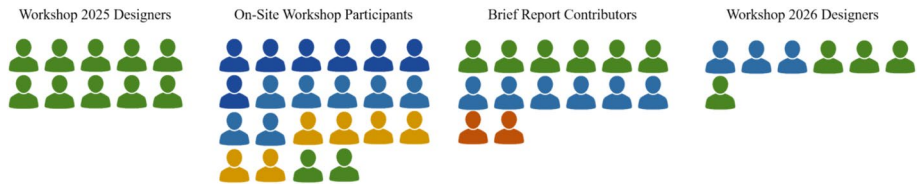


Fig. 4 Contributors. Green: original workshop designers; Blue: participants; Dark blue: participants that engaged in the pre-workshop exchange; Yellow: panelists; Red: ijCSCL reviewers

taxonomy draft. The process naturally extends the reported activities in this document through a hybrid Delphi method engaging both senior and junior CSCL members. Backed by the original team and key actors in the field (ijCSCL editors, CSCL committee), we consider this a testament to the sustainability of the initiated process. Beyond sustainability and peripheral mobility, the process has facilitated artefact refinement. The shift and narrowing of 11 initial topics to 2 selected topics in the workshop provides support for this observation.

Thus, while the goal of paradigm building has changed, the process enabled the identification of a key element and a project to pursue, which, in turn, signals a successful process, flexible enough to shift focus from the initial goal. There might be two interpretations to this result: either Kuhn's framing, grounded in natural sciences, is inadequate for CSCL, or paradigms are simply an emerging property of communicative processes, rather than something that can actively be built. It thus cannot be excluded that CSCL, through initiatives like the reported workshop and the forthcoming taxonomy building, might lead to theory and practice of an "evolved" paradigm⁴.

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Author contribution All authors reviewed (actively provided suggestions, comments, references in multiple review rounds) the whole manuscript. S.S. initiated, structured, organized and moderated the initial workshop proposal, the workshop itself and the subsequent paper writing and wrote initial drafts of introduction, previous workshops and the preworkshop activity part. B.Se. coordinated the team and writing around, and also wrote the section entitled "Workshop Discussion: One Definition to Rule Them All", while also running the workshop itself with S.S. M.G. coordinated the team and writing around, and also wrote the section entitled "Workshop Discussion: A CSCL Taxonomy" with O.C. M.P.T. coordinated the team and writing around, and also wrote the section entitled "Workshop Discussion: The Diversity of CSCL Theories" with M.S.M. and X.H. C.B. co-authored the workshop proposal, organized the workshop and co-authored introduction and conclusion with B.Sh. and E.T. M.C. co-authored the workshop proposal and organized the workshop with S.S. A.H.A. co-authored the workshop proposal and contributed substantial suggestions to all parts.

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Data availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The authors declare no competing interests.

⁴ A reference to the work of Koschmann & Scardamalia, entitled *Cscl: Theory and Practice of an Emerging Paradigm*.

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