

Unifying Knowledge Creation Process Through Cascading Modes of Communication

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Abstract. In this short paper, we elaborate the concept of Cascading Modes of Communication (CMC) for knowledge creation in social media. Through a review of CMC and Multi-Stakeholder Learning Dialogue (MSLD), the 3 distinct dimensions of knowledge creation processes: the Epistemological, the Ontological and the Communicative, are posited as reference for the analysis of the processes. Each SECI process is framed as a conversion of knowledge along all 3 dimensions. The relationship of Expansive Learning and SECI cycles is then explored. Two previously discussed SECI processes: Boom-up and Slip-down are explained as phenomenon observed in boundary crossing. Furthermore, two new SECI processes symmetric to Boom-up and Slip-down are identified: Boil-Up and Percolate-down, pointing to the pervading tension between tacit-explicit, local-global, and consensus-dissensus knowledge conversion processes. This tension provides a theoretical explanation for the self-sustaining nature underling all knowledge creation process. Thus, the social media scaffold in CMC is to function as boundary objects created to bridge the stages of knowledge creation processes.

1 Dimensions in SECI Communicative Discourses

In an earlier paper [1], we propose that SECI knowledge creation steps can be viewed as a communicative discourse with Cascading Modes of Communication (CMC) for knowledge creation in social media. Namely, viewed from a *Communicative Dimension*, each step corresponds to a particular Speech Act Pattern, with a distinct criteria for meaningfulness, and only appropriate in a certain kind of social media, as shown in Fig. 1.

As demonstrated in Mode 1 of Fig. 1, the main purpose of the speech acts for knowledge creation in Socialization is to convey the belief or emotion of an (or a group of) individual(s). For Socialization to be meaningful, the criteria is that the speech acts must be authentic, expressing the true feeling or belief of those involved in Socialization; *Epistemologically speaking*, this criteria is consistent with the tacit to tacit knowledge conversion as explained in the SECI framework. In Socialization, the participants can only take the “face value” of the actions meant by the other participants as each participant fully “accept” and “express” what’s in others’ and their own minds.

	SECI Space	Criteria of Meaningfulness	Communication Mode (Speech Act Pattern)	Social Media and Reports
Mode 1	<u>S</u> ocialization	Authenticity (truth and sincerity)	This, X, is truly what I believe/feel/like. (The expressives and constatives)	Blog or Social Network
Mode 2	<u>E</u> xternalization	Rationality (rightness and satisfaction)	I agree/disagree with /need to clarify about X, because of Y. (The declaratives and imperatives, and interrogatives)	Forum
Mode 3	<u>C</u> ombination	Normality (rightness and satisfaction)	Regardless of X, Z is what most of us believe/feel/like. (The directive-commissives, with concessions)	Wiki
Mode 4	<u>I</u> nternalization	Reality	Given Z, how do I do about X. (This involves material actions rather than communicative actions.)	Reflective; Report

Fig. 1. Cascading modes of communication

That is, the force of Expressive and Constative expressed by the Sender (of the message) does not invite particular reaction on the part of the Interpreter (who receives the message)¹. Here we can assume that the achievement of “consensus,” namely, X, is taken for granted, and there is no misunderstanding in the communication among the participants. *Ontologically speaking*, Socialization typically occurs in the context of a small group. However, from a bird’s eye view, though various small groups may have consensus within themselves, between different small groups, dissensus may remain. So when each small group come together, boundary crossing needs to happen before consensus can be achieved. Thus, a different Speech Act pattern needs to be adopted.

The main purpose of the speech acts in Externalization is to express agreement or disagreement with a particular participant’s belief or feeling by giving justification or clarification as shown in Mode 2 of Fig. 1. Continuing from the above scenario where two small groups encounter each other, the consensus of the two groups cannot be taken for granted. When dissensus does occur, it requires clarification and

¹ Speech Act is a schema involves several dimensions itself, including the “direction of it.” A Speech Act may require the World (external and subjective) to be conformed to the Message, or the Message to the World. The forces associated with Expressives and Constatives indicate the “direction of fit” is from the Message to the World that requires no obligation from the interpreter to do anything with respect to the sender’s Message. For further details please consult [2]. We also adopted the use of Sender and Interpreter from [2] to represent a Speaker and Listener involved in a communication, respectively.

argumentation to take place to resolve it. After each party examines the dissensus, if they think the dissensus cannot be resolved as such, they are required to give a justification or reason, namely, Y, why consensus cannot be achieved. If they think the dissensus can be resolved, they do the same. The justification is critical, and the discourse may progress requiring further background (Y_1 , Y_2 , etc.) to be foregrounded/clarified. It externalizes knowledge (explicit) hidden in the background (tacit) to allow further engagement so that the dissensus may be resolved. The justification also produces the force of a Directive², so the World (including the Interpreter) would conform to how the Sender would intend it to be. Nonetheless such force must be given in a logical way (or rationally), otherwise the Directive is not likely to be achieved. Viewed from an *Ontological dimension*, the scenario where Externalization occurs is not limited to between two small groups. In general, Externalization will be required as long as there is a boundary (social or historical) that needs to be crossed. For example, it could happen between an individual and another individual (due to different historical background). Or it could be between different levels of management in an organization (middle v.s. top managements). The main characteristic, viewed from an *Epistemological dimension*, is that in such discourse both parties use argumentation to foreground tacit knowledge that (meaningfully) may help to bridge the gap of mutual understanding to achieve common explicit knowledge. Now, for bigger grouping to happen along the Ontological dimension, another Speech Act pattern needs to be adopted.

As shown in Mode 3 of Fig. 1, at the Combination step, most relevant background knowledge (or tacit knowledge) pertaining to the point of discussion would have been foregrounded (made explicit), the focus is on what the explicit knowledge that has been commonly agreed is, without any prejudice. To demonstrate the extent to which bias should be avoided, as shown in the Speech Act pattern, a concession is given to say that even the Sender's own views are to be discounted – “Regardless of X,” which is what the Sender truly felt or believed. It is only with this neutral point of view, that the common knowledge can be committed together (a Commissive Speech Act)³. *Epistemologically speaking*, the combination of explicit knowledge, resulting in Z, has been the focus of most of the modern information management systems. Technologies such as Big Data Analytics is just one of the most recent development where structured or unstructured data are gathered to mine for patterns in business or social trends based on statistical inferences. However, the basis of such combination must be based on sources of data without any bias, if any information or knowledge that is excluded due to prejudice then the validity of conclusion would be flawed. Thus the selection of what explicit knowledge to be combined must follow a norm that is accepted by the community at large where the groups are a part. Thus *Ontologically speaking*, the leadership of the community must first establish itself as a legitimate authority to make a statement for the community, representing the consensus of the community, and not

² The Directive's “direction of fit” is World to Message [2], that means, the World must conform to what is communicated in the Message. Since the Sender is part of the World, s/he is then acquired the obligation to make the World as it is intended by the Sender.

³ A Commissive binds the Sender, together with its Interpreters, to a common course of action [3].

just for opinions of a particular interest group. Or put it another way, the one who is able to argue for and forge a commonly accepted knowledge will have the legitimacy to be the leader of the community/organization.

In Mode 4 of Fig. 1, when individuals are faced with the task of embodying Z in their individual practices, they may realize the discrepancy (which was X), if any. In such circumstance, the question: Given Z, how do I do about X, will naturally arise. If there is a great degree of consistency between Z and X, then the individual may find they can be in a leadership position to carry out what is intended by Z. Otherwise, they are obliged to be lead by the leadership in order to pursue Z. In these circumstances the Material Action, rather than Communicative Action, of the individual is what matters. The Material Action is targeted to bring about the desire conditions in the World that is consistent with Z. Ontologically speaking, an individual, or a small group, is being held accountable by a larger group or the entire organization against Z (which has been debated and accepted as a norm, at least for the time-being). Epistemologically speaking, the explicit knowledge is being converted to tacit knowledge as individuals, through developing new practices attempt to embody the new knowledge as the commonly accepted best practices.

As we complete the review of CMC, we have also realized that each step of a SECI knowledge creation process is not only performed with respect to the Epistemological dimension where the conversion between tacit and explicit knowledge takes place. It is also performed in an Ontological dimension where crossing layers of grouping: the individual, group, organization and social network levels, takes place. Most importantly, we also realize that in the Communicative dimension, each Speech Act is intended to bring about a consensus where dissensus exists. The situation is summarized in the following Table 1:

Table 1. Dimensions and scale in SECI knowledge creation process

Dimension	Scale	
Epistemological	Tacit	Explicit
Ontological	Local (smaller grouping)	Global (larger grouping)
Communicative	Dissensus	Consensus

Note that the proximity of tacit, local and dissensus knowledge is a by-product of human nature, as explicit, global and consensus is a result from efforts made through intentional communication that form part of the social realities that every human exists. In the next section, we shall review a theory, called Multi-Stakeholder Learning Dialogue (MSLD) that summarizes the same fact from various theories about organizational behaviors.

2 Sociological Research Paradigm and Multi-stakeholder Learning Dialogue

How individuals create knowledge in an organization can be compared to how sociological research is done in organizational sciences. In [4], Deetz posited two dimensions of contrast in the sociological research paradigm for organizations, which is based on the difference in discursive moves and social relations. The first dimension focuses on the origin of concepts and problem statements as part of the constitutive process in research. Local/emergent research conception is contrasted with “Elite/a priori”. Similarly, we may say knowledge creation may be originated from an individual or from a group of individuals (the leader of the group, particularly), who have some privileged access to certain critical knowledge or insights. Research orientation can also be contrasted in the extent to which they work within a dominant set of structuring of knowledge, social relations, and identities, called a “consensus discourse,” and the extent to which they work to disrupt these structuring, called the dissensus discourse. Once we have established the two dimensions, we arrive at the following landscape of representational practices in Sociological Research. As shown in Fig. 2, there are four distinct discursive discourses in the representation practice: Normative Studies, Interpretive Studies, Dialogic Studies, and Critical Studies. In [5], the author adapted the framework in Fig. 2 by suggesting that its four discursive discourse (or sensemaking) quadrants represent not only alternative ways of knowing but also potential stages in a conversational journey that enables theorists and practitioners to engage and comprehend the different social realities constructed by participants in a stakeholder network as shown in Fig. 3.

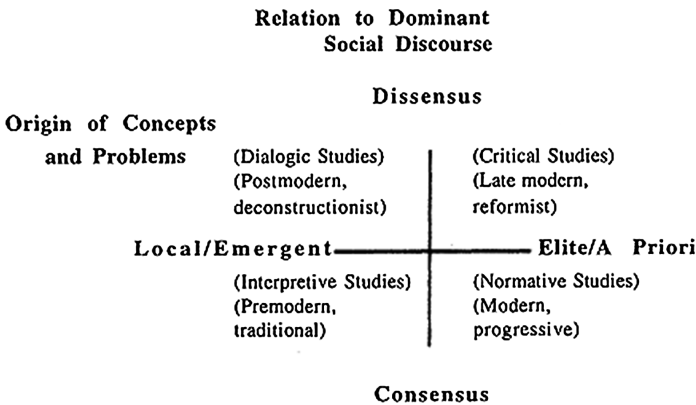


Fig. 2. Contrasting dimensions from the metatheory of representational practices

The authors then proceed to describe a Multi-Stakeholder Learning Dialogue (MSLD) that allow the managers to arrive a constructive ethics based on consulting the moral knowledge of all stakeholders in the network from moral persuasions and representational practices. They argued that “If we are to develop a coherent, credible

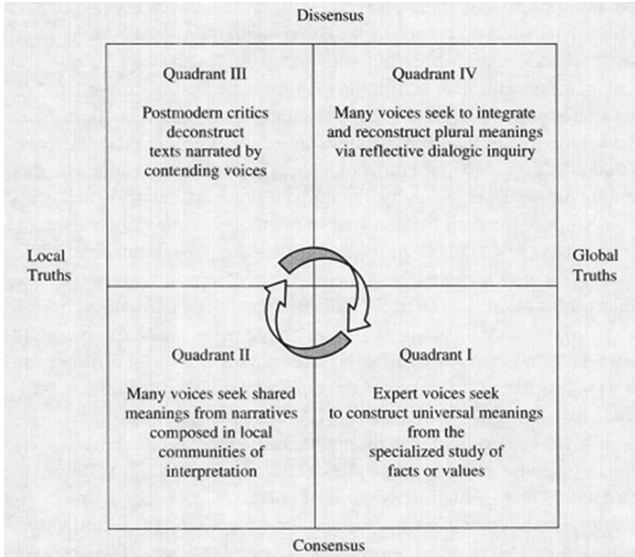


Fig. 3. Conversional journey to engage and comprehend paradoxical realities constructed by participants in a stakeholder network

representation of corporate citizen practice, we must get beyond Quadrant 1 efforts to dredge, sort and configure facts from the mixed record of pervious or existing organizational and social arrangements. Nor should we limit ourselves to deducing universal ethical values from hypothetical thought experiments (also Quadrant 1) in the hope that these value frameworks will shape the exercise of managerial discretion. We should not embrace without questioning the shared meanings constructed by local communities of interpretation in Quadrant 2. We should ask the tough questions about the paradoxical juxtapositions of observer and observed, facts and values and knowledge and power in the contested language games of Quadrant 3. In particular, we should be prepared to enter the transformational realm of reflective inquiry in Quadrant 4.

Here we can relate the spiral in Fig. 3 with the modes of in CMC if we align the Ontological dimension with the local truth and global truth dimension, and the Epistemological dimension with the dissensus (tacit) and consensus (explicit) dimension. Once the two dimensions are aligned, we arrive at the following 3 dimensional representations of Cascading Modes of Communication.

As shown in Fig. 4, it is noted that Quadrant I (Expert Voices seek to construct universal meaning) is mapped with Mode 3 (Combination/Commissive); Quadrant 2 (Many Voices seeking shared meaning), with Mode 2 (Internalization); Quadrant 3 (Postmodern critics deconstruct text), with Mode 1(Socialization/Expressives & Constatitives); Quadrant 4 (Multiple voices trying to integrate and reconstruct pluralistic meaning), with Mode 2 (Externalization/Directives). Figure 5 summarizes the mapping between SECI and MSLD.

These mappings may seem non-sensible at first sight. However, when we realize that the explanation given in MSLD and SECI actually assumes “opposite”

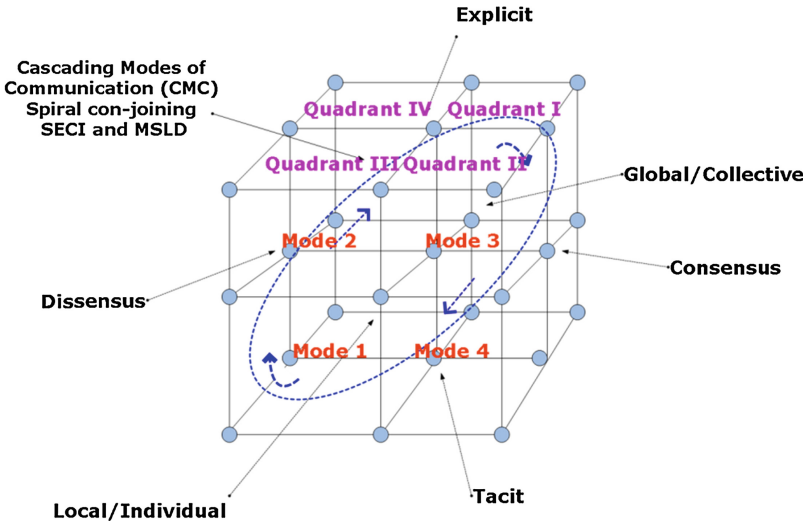


Fig. 4. Three dimensional CMC spiral joining SECI and MSLD

SECI	MSLD
Mode 1 (Socialization – Expressives & Constatives)	Quadrant 3 (Postmodern critics deconstruct text)
Mode 2 (Externalization – Directives)	Quadrant 4 (Multiple voices trying to integrate and reconstruct pluralistic meaning)
Mode 3 (Combination – Commisives)	Quadrant 1 (Expert voices seek to construct universal meaning)
Mode 4 (Internalization – Material Actions)	Quadrant 2 (Many voices seeking shared meaning)

Fig. 5. Mapping between SECI and MSLD

perspectives, the picture becomes clear. Namely, the theorizing of MSLD assumes the vintage point of the Organization (or the Management), while in SECI, it assumes that of the individuals (or the Employee). Once this is realized, we come to understand, for every knowledge creation step (or discursive discourse) there are always two, seemingly opposite, perspectives; namely, those of the Management’s vs. those of the Employee’s.

To be more specific, from a Management’s point of view, a Combination (Mode 1) represents the most desirable outcome where every individual (employee) has to commit to a common knowledge. The designated Experts in the organization will then be able to expound the truth across the entire organization to achieve the objectives obtained from such combination of knowledge (Quadrant 1). When such truth is percolated down the organizational hierarchy, Internalization (Mode 4) needs to take place. However, Internalization not only requires the individuals embodying the corporate norms, reciprocally, it also means that the organizations needs to allow space for

the accepted common knowledge (the truth) to be interpreted by the individuals to produce their respective, concrete meanings. Consequently, such contextualized meanings (tacit knowledge) in fact engender the creation of newer knowledge to complement (or contextualize) the accepted one. Internalization is followed by Socialization (Mode 1). In Mode 1, while the individuals are enjoying among their peers in their respective comfort zones, the Organization (or the Management) should be concerned whether such locally interpreted truths shared among individual employees are indeed aligned with the overall corporate goal intended by the common knowledge (the truth). It is likely that when the individualistic views (post-modernistic) deconstruct the text (the truth), which is regarded as the standard view, discrepancy will begin to emerge. Thus in Mode 2 (Externalization), it is when discrepancy of local truths becomes an issue that the individuals (the Employees) would be concerned enough to engage with each other in argumentation and debate (with the Management as well) in the hope that a common pluralistic meaning can be achieved (Quadrant 4). And such steps will repeat by itself until more and more tacit knowledge is surfaced, converted to explicit knowledge and combined, and then in turn internalized as tacit knowledge for the individuals and the process continues as the knowledge spiral continues to be traversed as needed.

3 Application of CMC to Re-analyzing SECI Case in View of Expansive Learning

In [6], an ontological shift SECI model was presented. The case on point was analyzed by two major kinds of SECI processes with reference to an ontological structure (namely, the hierarchy of an organization and social network): Booming-up and Slip-down. Booming-up is demonstrated to traverse upward in the ontological dimension that gathers momentum of a knowledge creation process. On the other hand, Slip-down is regarded as an opposite of Booming-up, where proposed new knowledge (from the lower organizational layer) was rejected at a higher layer. Thus, the introduction of the ontological dimension in SECI framework produces a distinction, namely, a *boundary* differentiating two groupings, and it is critical to the success of knowledge creation. However, concepts such as boundary and boundary crossing are foundational to Expansive Learning in the framework of Activity Theory. In what follows, we shall explore Expansive Learning to reveal its connection to SECI.

First, the expansive learning cycle (see Fig. 6) is used to clarify the state where the organization is at the moment (development challenge). Secondly, the cycle is used to guide the planning of the individual exercise sessions and discussions. The cycle consist of several learning acts: *questioning* present work practices – in CMC terms: expressing authentic but problematic feeling or belief resulting from problematical internalization of accepted truth, *analysing* historically the causes that have created problems in daily work – in CMC terms: clarifying and arguing a point by giving justification to doubts earlier expressed in socialization, *modelling* and *searching* for a new form of activity – in CMC terms: combing all argumentation to arrive an acceptable common ground to be committed together, *testing* and changing the activity and practices during the experimental phase and finally reflecting on the process and

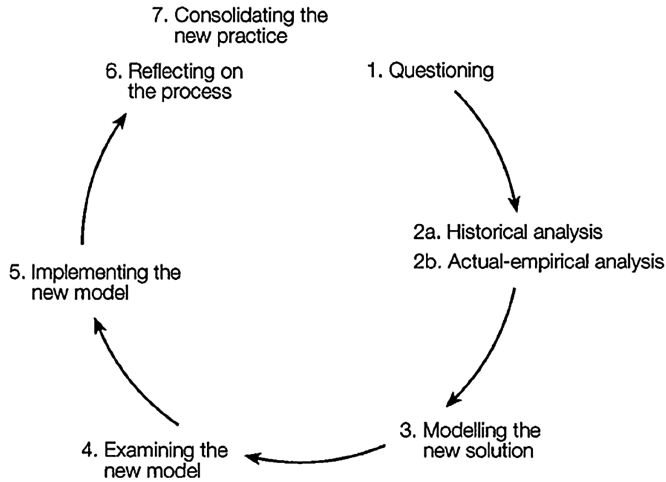


Fig. 6. Expansive cycle of learning actions.

implementing and *generalizing* the final concept of the activity – in CMC terms, internalizing the common ground committed through embodying the common ground in their actions [7–10]. Finally, as seen in the first learning act, the residual of unresolved internalizing knowledge will initiate another learning cycle and the process repeats itself again indefinitely.

Boundary objects then, in their myriad forms, are bridges between different communities of practice [11] or even social worlds [12]. Via their plasticity of meaning they translate ideas, viewpoints, and values across otherwise difficult to traverse organizational boundaries. Social media for knowledge creation as described in CMC can be viewed as boundary objects. In [11], Wenger elaborates on the idea of boundary crossing in the context of communities of practice. He argues that an established practice not only creates separation from others, i.e., boundaries, but also develops opportunities to interact with people in other practices. He explains that boundary objects help bridge different communities of practice, and that they can be digital documents or spaces, standardized methods or concepts. In [13], we have discussed how the social media has been integrated into a blended learning environment that indeed produce Expansive learning cycle as anticipated by Wenger.

In a more recent development of SECI research [6], the distinction between Boom-up and Slip-down SECI processes is made. By foregrounding the ontological dimension for SECI, it is observed the barriers to be overcome are similar to the phenomenon in a boundary crossing activity along the hierarchy of an organization. As argued above, it is clear that Expansive Learning is a self-sustaining activity system where the (intermediate) end of a series of learning activities would produce, by itself, the impetus that engenders a new series of learning activities, and result in a self-sustaining learning cycle. However, such self-sustaining nature of knowledge processes remain un-explained. This is because the end of Boom-up, as explained in [6], is commonly accepted knowledge, typically forming the basis of an innovative product that exploits its commercial benefits. At the same time, Slip-down is explained

as a detour that is to be overcome for assuming the Boom-up course of activities. The uni-directional process from local to global truth, along the ontological dimension, does not necessarily need to repeat itself in cycles. For knowledge creation process to be self-sustaining, what more in the processes needs to be brought to bear? With a careful examination, it is realized that a similar process to Slip-down needs can be identified. With reference to Fig. 4, Boom-up is clock-wise and global/collective-wise, activity while Slip-down is counter-clock-wise and local/individual wise, activity. However, the 3-dimensional CMC, as it is realized, allows us to hypothesize two activities that are symmetric to Boom-up and Slip-down, called here *Boil-up* and *Percolate-down*, respectively. Boil-up, a counter-clock-wise and global/collective-wise activity, representing the situation where a failed Internalization where revokes from the ground against the top arise. On the other hand, Percolate-down, a clock-wise and local/individual-wise activating, represents a successful Internalization where the ground indeed engages in developing the personalized practice of the accepted norm, which may produce genuine issues that would engender another cycle of learning activity. This can be summarize in Table 2.

Table 2. Symestrical knowledge creation process types

	Global/Collective-wise	Local/Individual-wise
Clock-wise	Boom-up	Percolate-down
Counter-clock-wise	Boil-up	Slip-down

The above observation points to the pervading tension between tacit-explicit, local-global, and consenses-discensus knowledge conversion processes. This tension provides a theoretical explanation for the self-sustaining nature underling all knowledge creation process. Thus, the social media scaffold in CMC is to function as boundary objects created to bridge the stages of knowledge creation processes as studied in [13].

4 Concluding Remarks and Future Research

This paper discusses Cascading Modes of Communication (CMC) for knowledge creation in social media based on two concepts: Multi-Stakeholder Learning Dialogue (MSLD) and Expansive Learning from the Epistemological, the Ontological and the Communicative perspectives. By establishing mapping between MSLD and SECI, and then Expansive Learning and SECI, it is shown that the three 3-dimensional CMC can serve to unify the learning activities discussed in these theories.

With the 3-dimesional CMC, it is further demonstrated: the two SECI types Boom-up and Slip-down in [6] can be paralleled by two symmetric SECI processes called Boil-up and Percolate-down, respectively. Most importantly, with Percolate-down, it provides a potential opening that SECI cycle can be continued; thus explain the self-sustaining nature of all knowledge creation processes.

This paper is the first attempt to explore how 3-dimensional CMC as a unifying theory can surface potential issues in previous theories; at the same time, provide added theoretical explanatory power for re-analyzing knowledge creation process with new

proposal. Nonetheless, it remains to be demonstrated the preliminary results discussed in this paper can be applied in a comprehensive analysis of the cases previously studied. Such application would be able to expose potential limitations of CMC as a theoretical framework.

Another important aspect of CMC is that it formulates a methodology to deploy social media as boundary objects for scaffolding boundary-crossing activities. It remains to be seen, after a preliminary case study [13], whether CMC can prove to be a practical tool to sustain robust expansive learning in activity systems.

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References

1. Wu, P.H., Uden, L.: Knowledge creation process as communication - connecting SECI and activity theory via cascading modes of communication. In: Proceedings of KMO 2014, pp. 403–412 (2014)
2. Eriksson, O.: A generic communication model based on Habermas and Searle's versions of speech act theory. *Listener* **1**, 5 (1999)
3. Searle, J.R.: *Speech Acts: An Essay in the Philosophy of Language*, vol. 626. Cambridge University Press, Cambridge (1969)
4. Deetz, S.: Crossroads-describing differences in approaches to organization science: rethinking Burrell and Morgan and their legacy. *Organ. Sci.* **7**(2), 191–207 (1996)
5. Calton, J.M., Payne, S.L.: Coping With paradox multistakeholder learning dialogue as a pluralist sensemaking process for addressing messy problems. *Bus. Soc.* **42**(1), 7–42 (2003)
6. Wu, Y., Senoo, D., Magnier-Watanabe, R.: Diagnosis for organizational knowledge creation: an ontological shift SECI model. *J. Knowl. Manag.* **14**(6), 791–810 (2010)
7. Engeström, Y.: *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research*. Orienta-Konsultit, Helsinki (1987)
8. Engstrom, Y.: Innovative learning in work teams: analyzing cycles of knowledge creation in practice. In: *Perspectives on Activity Theory*, p. 377. Cambridge University Press, Cambridge (1999a)
9. Engeström, Y.: Expansive visibilization of work: an activity-theoretical perspective. *Comput. Support. Coop. Work (CSCW)* **8**(1–2), 63–93 (1999)
10. Engestrom, Y.: Activity theory as a framework for analyzing and redesigning work. *Ergonomics* **43**(7), 960–974 (2000)
11. Wenger, E.: *Communities of Practice: Learning, Meaning, and Identity*. Cambridge University Press, Cambridge (1998)
12. Becky, B.A.: Sharing meaning across occupational communities: the transformation of knowledge on a production floor. *Organ. Sci.* **14**, 312–330 (2003)
13. Horng-Jyh, P.W.: Knowledge and community formation via cascading modes of communication with a case study and research design. In: Uden, L., Wang, L.S.L., Rodriguez, J.M.C., Yang, H.-C., Ting, I.-H., (eds.) *The 8th International Conference of Knowledge Management in Organizations*, pp. 189–204. Springer, Netherlands (2004)