Kristine S. Lund | **January 2023**

Education

2016	HDR[1]	Educational Sciences	University of Grenoble, France
2003	Ph.D.	Cognitive Science	University of Grenoble, France
1996	M.S.	Artificial Intelligence	University of Pierre and Marie Curie, Paris, France
1987	B.A.	Computer Science	Gustavus Adolphus College, St. Peter, MN, USA

Positions

2013->	Senior Research Engineer (outstanding class[2])
2012	Senior Research Engineer (first class)
2009-2023	Chief Scientific Officer and co-founder of Cognik
2005	Senior Research Engineer (second class)
2004-2005	Visiting Scholar at the PACE Center, Yale University
2000	Junior Research Engineer in Human and Social Sciences
1991	Junior Research Engineer in Computer Science

Appointments

March 2018->	Director of the ASLAN Laboratory of Excellence (4,3 million-euro grant)
Jan 2015->Nov 2020	Coordinator of the Education, Cognition, Language Academic College
2007-2010	Vice Director of the ICAR Language Sciences Research lab

Distinction

Fellow of the International Society of the Learning Sciences; 2020 inductee

Advisor for National Science Foundation projects

- Mapping, Clarifying, and Communicating Key Ideas about Collaborative Learning to STEM Audiences, with Digital Promise Global (2021-2023)
- ECR: nCoder+—A tool for subgroup-fair coding of STEM learning data at scale, with University of Wisconsin, Madison (2017-2026)

Co-directed interdisciplinary Ph.D. theses

1. Jean-Philippe Arias-Zapata: 2021-2024 Ph.D. in **Philosophy, Epistemology** (Ecole Normale Supérieure de Lyon), co-directed with Magali Ollagnier-Beldame, *Ressentir le vivant ?* (Experience the living ?)
2. Anda Fournel: 2018 Ph.D. in **Language Sciences** (UPMF Grenoble), co-directed with Jean-Pascal Simon; directed by Jean-Marc Colletta, *Construction du questionnement et apprentissage du questionner dans les discussions philosophiques* (Construction of questioning and learning to question in philosophical discussions)
3. Martin Galilé: 2017 Ph.D. in **Educational Sciences** (UPMF Grenoble), co-directed with Erica de Vries, *Appropriation et traitement cognitif de représentations externes émergentes : paradoxe représentationnel et prise en compte de la spécificité du domaine d'application* (Appropriation and cognitive treatment of external emerging representations : the representational paradox and taking into account the specificity of the application domain)
4. Claire Polo: 2014 Ph.D. in **Educational Sciences** (University of Lyon 2), co-directed with Gerry Niccolai; directed by Christian Plantin, *Débat, diversité et développement durable : l'argumentation d'adolescents débattant de questions socio-scientifiques à l'école, à l'occasion de « cafés scientifiques » organisés en France, Mexique et USA* (Debate, diversity and sustainable development: the argumentation of adolescents who debate socio-scientific questions at school, during « scientific cafés », organized in France, Mexico and the United States)
5. Jean-Laurent Cassier: 2010 Ph.D. in **Industrial Engineering** (INP de Grenoble), co-directed with Guy Prudhomme; directed by Daniel Brissaud, *Modélisation de l'Activité de Conception Collaborative Synchrone de Produits Industriels* (Modeling collaborative synchronous design of industrial products).
6. Gregory Dyke: 2009 Ph.D. in **Computer Science** (Ecole de Mines St. Etienne), co-directed with Jean-Jacques Girardot, *Un Modèle pour la Gestion et la Capitalisation d'Analyses de Traces d'Activités en Interaction Collaborative* (A model for the management and the capitalization of the analysis of collaborative interaction traces).

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[1] *Habilitation à Diriger des Recherches,* https://en.wikipedia.org/wiki/Habilitation

[2] This is a French translation, representing a progression through promotions

Member of additional Ph.D. jurys

- Lara Kataja, named in January 2021, **Doktors der Philosphie**, *der Fakultät für Empirische Humanwissenschaften und Wirtschaftswissenschaft er Universität des Saarlandes*. Title: Co-Present Learning With Tablets in Primary School
- Alaric Kohler, named in November 2020, *docteur ès* **Sciences Humaines et Sociales**, *Institut de Psychologie et Éducation, Université de Neuchâtel*. Title: *Approches psychologiques de situations de malentendu dans des activités de didactique des sciences (Psychological approaches to situations of misunderstanding in activities of science didactics)*
- Elnaz Jalilian, named in October 2020, *docteur de l'Université Grenoble Alpes en Sciences du Langage, spécialité* **Sociolinguistique, Acquisition, Multimodalité**. Title: *Références spatiales dans la communication multimodale : Une étude interlangue et développementale sur l'expression verbale et gestuelle du « mouvement » dans des récits parlés en persan et en azéri (Spatial references in multimodal communiation : an interlingual and developmental study on the verbal and gestural expression of « movement » in spoken narratives in Persian and Azeri)*
- Jaana Isohätälä, named in June 2020 Doctor of the **Faculty of Education** at the University of Oulu. Title: the interplay of cognitive and socio-emotional processes in social interaction: Process-oriented analyses of collaborative learning
- Mohamedade Farouk, named in December 2008, *docteur de l'Université Paris 8 dans la discipline informatique au sein de l'école doctorale* **Cognition, langage, interaction**. Title: *Modélisation du comportement verbal et non verbal d'un agent pédagogique : une étude exploratoire* (Modeling of the verbal and non-verbal behavior of a pedagogical agent)

Project and community leadership

- Project leader on [EducMap](#): Collective and reflexive cartography of research in education
- Founding member of the piloting committee of the [Laboratoire de l'Education](#), seedbed for interdisciplinary projects
- Member of the French national [*Réseau Thématique Pluridisciplinaire Education*](#)
- Founding member of [INSciTS](#), the International Network for the Science of Team Science
  - Member of [Intereach](#)
- Founding member of the Global Alliance for Inter- and Transdisciplinarity: [ITD-Alliance](#)
  - Member of working group [Integration Experts](#)
- Workgroup co-chair on [conceptualizing narrative complexity](#) in the COST Network [INDCOR](#)
- Chair, Computer Supported Collaborative Learning Conference ([CSCL 2019](#)), June 17-21, Lyon
- Board Member of ISLS 2010-2017
  - Chair of the ISLS Education Committee (annual Doctoral Consortia, Early & Mid-Career)
- Co-chair of the ISLS Conference Committee → 2023 and member of the ISLS Financial Task Force
- Member of the International Society of the Learning Sciences Early Career Award Committee
- Member of the International Society of the Learning Sciences Fellows Selection Committee
- Member of the International Society of the Learning Sciences Board Nominations Committee
- Member of the editorial board of the [International Journal of Computer Supported Collaborative Learning](#) since 2014
- Member of the editorial board of the [Journal of Learning Analytics](#) since 2018
- Associate editor of [QWERTY](#): Open and Interdisciplinary Journal of Technology, Culture, and Education
- Chair, Alpine Rendez-Vous on Technology Enhanced Learning 2011 in La Clusaz, France
- Invitation to review grant submissions from the *Agence Nationale Scientifique* (ANR), the CNRS *Candidature d'Assistant Hospitalier de Recherche*, the Flanders Research Foundation Flanders (FWO), and the German Israeli Foundation for Scientific Research and Development
- Reviewing for the following journals: Cognition & Instruction, Computers & Education, Educational Research Review, Instructional Science, International Journal of Computer Supported Collaborative Learning, Journal of Educational Psychology, Journal of Pragmatics, Journal of the Learning Sciences, The International Journal of Human-Computer Studies

Invited International Keynotes

- *Kasvastustieteen päivät* 2022, Oulu, **Finland** — "What is multivocality, what challenges does it bring and how can we help as educators, researchers, and policy makers?
- Human Computer Interaction 2019, **Korea** — "Pivotal moments for decision making in computer

aided collaborative design"
- ELyT Global (International CNRS Associated Laboratory of Material Sciences between Tohoku University, INSA-Lyon and Ecole Centrale de Lyon) 2019, **Japan** — "Team Science and Interdisciplinary Research in Lyon"
- Centre for Information Technology in Education Research Symposium 2009, **Hong Kong** —"Are different approaches to the analysis of online and face-to-face CSCL discourse complementary or contradictory?"

Peer Reviewed Journal articles

1. Eberle, J., Stegmann, K. Barrat, A. Fischer, F. & **Lund**, K. (2021). Initiating scientific collaborations across career levels and disciplines – a network analysis on behavioral data. *International Journal of Computer Supported Collaborative Learning. 16,* 151-184. 10.1007/s11412-021-09345-7
2. Isohätälä, J., Näykki, P., Järvelä, S., Baker, M., & **Lund**, K. (2021). Social sensitivity: a manifesto for CSCL research. *International Journal of Computer-Supported Collab. Learning. 16*, 289–299. 10.1007/s11412-021-09344-8
3. Polo, C. & Lund, K. (2021). La saisie émotive du kairos avec des enfants : entre acte philosophique et geste didactique. Studia UBB, Cluj, 66, 103-104.
4. Mazur-Palandre, A., Colletta, J.M. & **Lund**, K. (2021) « Alors, là, je vais vous expliquer comment on joue ! » Explication procédurale finalisée dans une perspective développementale [Ok, I'm going to teach you how to play! Finalized procedural explanation within a developmental perspective. *Langages*, Armand Colin (Larousse jusqu'en 2003). https://www.revues.armand-colin.com/lettres-langues/langages/langages-no-221-12021/je-vais-vous-expliquer-comment-on-joue-explication-procedurale-finalisee-perspective
5. **Lund**, K., Jeong, H., Grauwin, S. & Jensen, P. (2020) Research in Education Draws Widely from the Social Sciences and Humanities. Front. Educ. 5:544194. 10.3389/feduc.2020.544194
6. **Lund**, K. (2019). Building and regulating cognitive, linguistic, and interactional aspects of knowledge between the individual and the group. *Computers in Human Behavior*, 100, 370-383. 10.1016/j.chb.2019.04.013
7. **Lund**, K., Quignard, M., & Shaffer, D.W. (2017). Gaining Insight by Transforming Between Temporal Representations of Human Interaction. *Journal of Learning Analytics*. 4(3) 102-122. 10.18608/jla.2017.43.6
8. **Lund**, K., Jeong, H., Grauwin, S., & Jensen, P. (2017). Une carte scientométrique de la recherche en éducation vue par la base de données internationales Scopus [A scientometric map of research in education according to the international Scopus database]. Les Sciences de l'éducation - Pour l'Ère nouvelle, vol. 50, n° 1. 67-84. https://www-cairn-info.inshs.bib.cnrs.fr/revue-les-sciences-de-l-education-pour-l-ere-nouvelle-2017-1-page-67.htm
9. Polo, C. Plantin, C., **Lund**, K., & Niccolai, G. (2017). Emotional Positioning as a Cognitive Resource for Arguing: Lessons from the Study of Mexican Students Debating about Drinking Water Management. *Pragmatics & Society, 8(2).* 323–354. 10.1075/ps.8.3.01pol
10. Polo, C. Plantin, C., **Lund**, K., & Niccolai, G. (2017). Group Emotions in Collective Reasoning: a Model. *Argumentation. 31(2).* 301–329. 10.1007/s10503-016-9407-5
11. Polo, C. Plantin, C., **Lund**, K., & Niccolai, G. (2016). Savoirs mobilisés par les élèves dans des cafés science : grille de caractérisation issue d'une étude internationale. (Mexique, USA, France). *Recherches en didactique des sciences et des technologies*. 13, 193-220. 10.4000/rdst.1359
12. Polo, C., **Lund**, K., Plantin, C. & Niccolai, G. (2016). Group Emotions: The Social and Cognitive Functions of Emotions in Argumentation. *International Journal of Computer Supported Collaborative Learning.* 11(2), 123–156. 10.1007/s11412-016-9232-8
13. **Lund**, K. & Suthers, D. (2016) Le Déterminisme Méthodologique et le Chercheur Agissant. *Éducation & Didactique* 10 (1). 27-37. https://doi.org/10.4000/educationdidactique.2439
14. Mazur-Palandre, A. & **Lund**, K (2016). Explanatory content and visibility effects on the young child's verbal and gestural behavior in free dialogues. *Language, Interaction and Acquisition.* 7(2), 180-211. https://doi.org/10.1075/lia.7.2.02maz
15. Mazur-Palandre, A., Colletta, J.M. & **Lund**, K (2014). Context sensitive 'how' explanation in children's multimodal behavior, *Journal of Multimodal Communication Studies, 2,* 1-17. https://halshs.archives-ouvertes.fr/halshs-01927270
16. Polo, C., Plantin, C., **Lund**, K. & Niccolai, G. (2013). Quand construire une position émotionnelle, c'est choisir une conclusion argumentative : le cas d'un café-débat sur l'eau potable au Mexique. *Semen, 35*, 41-63. https://doi.org/10.4000/semen.9800
17. Dyke, G., **Lund**, K. & Girardot, J.-J. (2010). Tatiana, un environnement d'aide à l'analyse de traces d'interactions humaines. *Revue des Sciences et Technologies de l'Information - Série TSI : Technique et*

Science Informatiques, 29(10), 1179-1205.

18. **Lund**, K. (2007). The importance of gaze and gesture in interactive multimodal explanation. *International Journal of Language Resources and Evaluation, 41*(3-4), 289-303. https://doi.org/10.1007/s10579-007-9058-0

19. **Lund**, K., Molinari, G., Séjourné, A. & Baker, M.J. (2007). How do argumentation diagrams compare when student pairs use them as a means for debate or as a tool for representing debate? *International Journal of Computer-Supported Collaborative Learning, 2*(2-3), 273-295. https://doi-org.inshs.bib.cnrs.fr/10.1007/s11412-007-9019-z

20. Baker, M.J., Andriessen, J., **Lund**, K., van Amelsvoort, M., & Quignard, M. (2007). Rainbow: a framework for analysing computer-mediated pedagogical debates. *International Journal of Computer-Supported Collaborative Learning, 2* (2-3) 315-357. https://doi.org/10.1007/s11412-007-9022-4

21. Prudhomme, G., Pourroy, F., & **Lund**, K. (2007). An empirical study of engineering knowledge dynamics in a design situation. *Journal of Design Research*, *6*(3), 333-358. Journal of Design Research, 6(3), 333 - 358. 10.1504/JDR.2007.016388

Edited books/conference proceedings and book chapters

1. **Lund**, K., Basso Fossali, P.L., Mazur, A. & Ollagnier-Beldame, M. (Eds.) (2022). *Language is a complex adaptive system: Explorations and evidence*, (Conceptual Foundations of Language Science). Language Science Press.

2. Basso Fossali, P.L. & Lund, K. (2022). Introduction to language as a complex adaptive system. in (Eds.) K. **Lund**, P.L. Basso Fossali, A. Mazur, & M. Ollagnier-Beldame, *Langage is a complex adaptive system: Explorations and evidence*, (Conceptual Foundations of Language Science). (pp. v-xv). Lang. Science Press.

3. **Lund**, K. (2022). Modeling the co-elaboration of knowledge: connecting cognitive, linguistic, social and interactional systems. in (Eds.) K. Lund, P.L. Basso Fossali, A. Mazur, & M. Ollagnier-Beldame, *Langage is a complex adaptive system: Explorations and evidence*, (Conceptual Foundations of Language Science). (pp. 35-48). Lang. Science Press.

4. Polo, C. **Lund**, K. Plantin, C., & Niccolai. G.P. (2022). Collective reasoning as the alignment of self-identity footing. in (Eds.) K. Lund, P.L. Basso Fossali, A. Mazur, & M. Ollagnier-Beldame, *Langage is a complex adaptive system: Explorations and evidence*, (Conceptual Foundations of Language Science). (115-130). Language Science Press.

5. **Lund**, K., Basso Fossali, P.L, Mazur, A. & Ollagnier-Beldame, M. (2022). Considering the complex adaptive system from multiple vantage points. in (Eds.) K. Lund, P.L. Basso Fossali, A. Mazur, & M. Ollagnier-Beldame, Langage is a complex adaptive system: Explorations and evidence, (Conceptual Foundations of Language Science). (pp. 181-194). Language Science Press.

6. Dario, N., **Lund**, K. & Tateo, M. (2022). Mapping Visual Marginalia in Educational Contexts: A Model for New Types of Self-Regulation of Learning. In (Eds.) Chinn, C., Tan, E., Chan, C., & Kali, Y. Proceedings of the 16th International Conference of the Learning Sciences-ICLS2022. (pp. 250-257). Hiroshima, Japan: International Society of the Learning Sciences.

7. Ludvigsen, S., **Lund**, K. & Oshima, (2021). A Conceptual Stance on CSCL History. In U. Cress, C. Rosé, A. Wise, & J. Oshima (Eds.). *International Handbook of Computer-Supported Collaborative Learning*, (pp. 45-63). Springer International Publishing.

8. **Lund**, K., Niccolai, G.P. Lavoué, E., Hmelo-Silver, C. Gweon, G. & Baker, M. (2019). *A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings - 13th International Conference on Computer Supported Collaborative Learning (CSCL 2019).* June 2019, Lyon, France. A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings - 13th International Conference on Computer Supported Collaborative Learning (CSCL 2019). June 2019, Lyon, France. https://www.isls.org/cscl/2019/www.cscl2019.com/index.html

9. **Lund**, K., & Suthers, D. (2018). Multivocal Analysis: Multiple Perspectives in Analyzing Interaction. In F. Fischer, C. E. Hmelo-Silver, S.R. Goldman & P. Reimann (Eds.), *International Handbook of the Learning Sciences.* (pp. 455-464). Taylor-Francis/Routledge. https://www.routledge.com/International-Handbook-of-the-Learning-Sciences/Fischer-Hmelo-Silver-Goldman-Reimann/p/book/9781138670563

10. Kirschner, P. & **Lund**, K. (2017). Finding a Middle Ground: Wars Never Settle Anything. In L. Lin & J. M. Spector (Eds.), *The Sciences of Learning and Instructional Design Constructive Articulation Between Communities* (pp. 37-51). Taylor-Francis/Routledge.

11. **Lund**, K. & Quignard, M (2017). The dangers of assuming before analysis: three case studies of argumentation and cognition. Making a difference: prioritizing equity and access in CSCL: Computer Supported Collaborative Learning (CSCL) 2017, International Society of the Learning Sciences, Jun 2017, Philadelphia, Pennsylvania, United States. (pp. 231-238). (halshs-01580587)

12. Eberle, J. **Lund**, K., Tchounikine, P. & Fischer, F. (Eds.). (2016). *Grand Challenges in Technology Enhanced*

Learning 2 MOOCs and Beyond: Perspectives of Research, Practice, and Policy Making Developed at the Alpine Rendez-Vous 2013. Springer. https://www.springer.com/gp/book/9783319125619

13. Eberle, J. **Lund**, K., Tchounikine, P. & Fischer, F. (2016). Introduction. In J. Eberle, K. **Lund**, P. Tchounikine, & F. Fischer (Eds.), *Grand Challenges in Technology Enhanced Learning 2: Perspectives of Research, Practice, and Policy Making Developed at the Alpine Rendez-Vous 2013 (pp. 1-5)*. Springer. https://www.springer.com/gp/book/9783319125619

14. Chanel, G., Lalanne, D., Lavoué, E., **Lund**, K., Molinari, G., Ringeval, F., Weinberger, A. (2016). Adaptive group awareness for social regulation of emotions in computer-supported collaborative learning. In J. Eberle, K. **Lund**, P. Tchounikine, & F. Fischer (Eds.), *Grand Challenges in Technology Enhanced Learning 2 MOOCs and Beyond: Perspectives of Research, Practice, and Policy Making Developed at the Alpine Rendez-Vous 2013* (pp. 13-16). Springer. https://www.springer.com/gp/book/9783319125619

15. Suthers, D. D., **Lund**, K., Rosé, C. P., Teplovs, C. & Law, N. (Eds.). (2013). *Productive Multivocality in the Analysis of Group Interactions.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15. Springer.

16. Dyke, G., **Lund**, K., Suthers, D. D., & Teplovs, C. (2013). Analytic representations and affordances for productive multivocality. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions*. In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15 (pp. 639-658). Springer.

17. **Lund**, K., Rosé, C. P., Suthers, D. D., & Baker, M. (2013). Epistemological encounters in multivocal settings. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15 (pp. 659-682). Springer.

18. **Lund**, K., & Suthers, D. D. (2013). Methodological dimensions. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15 (pp. 21-35). Springer.

19. Suthers, D. D., Rosé, C. P., **Lund**, K., & Teplovs, C. (2013). A readers' guide to the productive multivocality project. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15. *(*pp. 37-59). Springer.

20. **Lund,** K., Prudhomme, G., & Cassier, J.L. (2013). Pivotal moments for decision making in collaborative design: are they teachable? In S. Goggins, I. Jahnke & V. Wulf (Eds.), *CSCL@Work: Case Studies of Collaborative Learning at Work.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 14 (pp. 243-268). Springer.

21. Suthers, D. D., **Lund**, K., Rosé, C. P., & Teplovs, C. (2013). Achieving Productive Multivocality in the Analysis of Group Interactions. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15 (pp. 577-612). Springer.

22. **Lund**, K. (2013). Multivocal Analysis of Pivotal Moments for Learning Fractions in a 6th-Grade Classroom in Japan. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions*. In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15 (pp. 161-180). Springer.

23. **Lund**, K. & Bécu-Robinault, K. (2013). Conceptual Change and Sustainable Coherency of Concepts Across Modes of Interaction. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions*. In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15 (pp. 311-330). Springer.

24. Rosé, C.P. & **Lund**, K. (2013). Methodological Pathways for Avoiding Pitfalls in Multivocality. In D. D. Suthers, K. Lund, C. P. Rosé, C. Teplovs & N. Law (Eds.), *Productive Multivocality in the Analysis of Group Interactions.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 15 (pp. 613-637). Springer.

25. **Lund**, K. (2011). Analytical frameworks for group interactions in CSCL systems. In Puntambekar, Erkens and Hmelo-Silver (Eds.) *Analyzing Interactions in CSCL: Methods, Approaches and Issues.* In C. Hoadley & N. Miyake (Series Eds.), *Computer Supported Collaborative Learning Series*: Vol. 12 (pp. 391-411). Springer.

Blog posts at Integration and Implementation Insights

1. Productive multivocal analysis – Part 1: Avoiding the pitfalls of interdisciplinarity, 2017
2. Productive multivocal analysis – Part 2: Achieving epistemological engagement, 2017
3. Strategies to deal with forced hostile collaborations, 2020