Intern. J. Comput.-Support. Collab. Learn (2022) 17:327–331
https://doi.org/10.1007/s11412-022-09378-6

Supporting perspective taking across chasms of thinking: Do real-time analytics hold the key?

Carolyn Rosé[1] · **Sanna Järvelä**[2]

Published online: 27 September 2022

Introduction

This edition of the International Journal of Computer-Supported Collaborative Learning comes just as many of us are about to or have recently begun a new academic year. Though COVID continues to be a force to contend with, this Fall brings a marked change from the past few Falls in terms of the ability to gather and enjoy community.

This September issue comprises four full articles with three interrelated themes, namely, the ability to grow, assessments to measure growth, and real time assessment through analytics to prompt growth. These topics are contextualized within challenging contexts where growth occurs as individuals reach beyond the comfort zone of their own perspective, culture, and history, and reach out for others different from themselves. In short, together in their own way these articles each explore what we as an interdisciplinary CSCL community can do to design and build theory-grounded technologies to support learning and growth not only in the face of challenges, but also benefiting from those challenges (Bjork & Bjork, 2020; Kapur & Bielaczyc, 2012; Nihalani & Robinson, 2022). The articles are set in contexts that span the gamut from K-16 through post-baccalaureate education. Thus, regardless of student population, these articles interact with and contribute to the critical work our community is doing as we are all participants in the creation of a world beyond the adversities of the world's recent past.

We think that this issue clearly shows how our research field purposefully weaves together strong theories and concepts with novel analytic methods to respond to timely and emerging questions in CSCL. For example, the papers integrate some fundamental concepts of collaborative learning, such as shared meaning making and sensitive multicultural nuances in interactions or deep theory on dialogism alongside new approaches to visual learning analytics. The papers also show how new analytic methods and digital trace data

✉ Carolyn Rosé
cp3a@andrew.cmu.edu

Sanna Järvelä
sanna.jarvela@oulu.fi

[1] Carnegie Mellon University Language Technologies Institute and HCI Institute, Pittsburgh, PA, USA

[2] University of Oulu, Oulu, Finland

can be fashioned into tools to prompt learners and teachers in the practice of CSCL (Rosé, & Dimitriadis, 2021).

A theoretical foundation for investigating growth

The first two articles of the edition theorize and operationalize growth and collaboration prompted by challenges. The first article, by Shiri Kashi and Yotam Hod, is entitled "Fostering Growth Orientations in Students' Identities as Knowledge Builders". This article breaks new theoretical ground in conceptualization of human growth, building on Dweck's theory of mindset (Dweck, 2006, 2013). In particular, Kashi and Hod present a study that took place over a semester in a graduate course conceptualized as a Humanistic knowledge building community (HKBC) (Hod & Ben-Zvi, 2018), a type of collaborative environment designed with the aim of supporting identity development and knowledge advancement. The Kashi and Hod article uses analysis of student utterances to illustrate this growth over time in a specific course, where the collected data included audio, video, and wiki entries from throughout the semester. Their core analysis of student utterances collected over the entire semester made use of a five dimensional coding scheme, which was used in order to illustrate the process of growth. The analysis points to statistically significant growth effects over time that highlight the value in the synergy between collective and individual advancement. This work builds on decades of work towards making collaborative processes visible through process analyses (Rosé, 2017; Janssen et al., 2010; Gaßner et al., 2003).

The second article intensifies the focus on challenge while honing in on the heart of collaboration, namely the process of joint meaning making, speaking to literature on learning through contentious discussions (Pollack & Ben-David Kolikant, 2012; Firer et al., 2021). In the second article, Tugce Aldemir, Marcela Borge, and Jose Soto thus address the fascinating and timely topic of measurement of the quality of some of the most challenging collaborative discussions in an article entitled "Shared meaning-making in online intergroup discussions around sensitive topics". Their work is set within an undergraduate course. Their analysis brings two alternative models into conversation with one another, namely their proposed model of multicultural collaborative competence (MCC) and their preexisting general model of collaborative competence (GCC). In their analysis, MCC enabled them to highlight four very frequent patterns, which had some overlap with more general patterns operationalized through GCC, but offering a more vivid and comprehensive image of collaboration in this setting. This work offers a methodological advance addressing challenges inherent in work on CSCL from a cross-cultural perspective (Gu et al., 2017; Weinberger et al., 2013).

Real time analytics for prompting growth

In light of the conceptual focus on the process of growth investigated in the early two articles of this edition, the final two articles delve into real time analytics and their potential for prompting growth as a form of automated assessment in action displayed through awareness tools. This article thus hearkens back to our March special issue on Awareness Tools in support of Group Regulation (Schnaubert & Bodemer, 2022). However, while the papers of that issue focus mainly on theoretical development through

rich argumentation and empirical studies that offer a deeper understanding of the important role that group awareness plays (Kielstra et al., 2022; Rojas et al., 2022; Vogel et al., 2022; Zimmerman & Land, 2022), the two papers of this edition of the journal include and highlight technical work on analytics that enable awareness through real time sensing. More broadly, these two articles thus speak to a growing subcommunity of researchers exploring the role modeling technologies can play in prompting support for learning (Bodily et al., 2018).

Both of the final two articles of this September edition of the journal focus on K-12 education. In the first such paper, Liru Hu, Jiajun Wu, and Gaowei Chen offer their article entitled "iTalk–iSee: A participatory visual learning analytical tool for productive peer talk". The iTalk-iSee tool is the latest in a progression of technical approaches and tools related to analytics for prompting reflection of instructors or teachers related to their discourse practices (Chen et al., 2015; Chiu & Chen, 2014). The iTalk-iSee tool in particular is couched in the theory of Bakhtinian dialogism (Trausan-Matu et al., 2021) and makes talk processes visible to students, thus offering them a position of agency in regulating their engagement in light of what they see, interpret, and respond to through a scaffold that follows a three-step paradigm (code visualize reflect). The authors conduct a field study as part of an iterative user-center development process and highlight the design elements found to be effective in that investigation.

Following up on earlier work published in the journal related to awareness tools set in wiki environments (Ollesch et al., 2021) and other work on analytics that support the teacher's role in a collaborative learning classroom (Tissenbaum & Slotta, 2019), the final article, by Xiao Hu, Jeremy Ng, and Samuel Chu, is entitled "Implementing Learning Analytics in Wiki-Supported Collaborative Learning in Secondary Education: A Framework-Motivated Empirical Study". The Learning Analytics enabled awareness tool they present is called Wikiglass, which is a tool used both by teachers and by students. Like the Kashi and Hod article, the study presented in this paper investigates collaboration both at the individual and group levels over a whole semester. In addition to the trace data collected through Wikiglass, interview data was collected as well from the 440 students and six teachers who participated in the study. The analysis illustrates the interplay between the respective use of the tool by teachers and by students.

Wrapping up

Speaking to and adding to ongoing conversations with and across research communities, the articles of this September edition highlight the central importance of assessment as both a measure of and catalyst for human growth. Taken together, these articles offer inspiration for the field of CSCL to aim for impact that extends beyond standardized intellectual achievement exams by offering a foundation on which to build technologies that enable and improve collaboration in the face of deep seated prejudices, entrenched bitterness, and clashing political agendas when much is at stake.

Closer to home, we hope that this issue will prompt productive reflection on teaching practices, and the potential held by the interdisciplinary integration of this community's theoretical and technical work. As we enter a new academic year, may we all grow both as individuals and as a community as we ourselves reach beyond the confines of our own thinking and practices.

References

Bjork, R. A., & Bjork, E. L. (2020). Desirable difficulties in theory and practice. *Journal of Applied Research in Memory and Cognition, 9*(4), 475.

Bodily, R., Kay, J., Aleven, V., Jivet, I., Davis, D., Xhakaj, F., & Verbert, K. (2018). Open learner models and learning analytics dashboards: a systematic review. In *Proceedings of the 8th international conference on learning analytics and knowledge* (pp. 41–50).

Chen, G., Clarke, S. N., & Resnick, L. B. (2015). Classroom Discourse Analyzer (CDA): A discourse analytic tool for teachers. *Technology, Instruction, Cognition and Learning, 10*(2), 85–105.

Chiu, M. M., & Chen, G. (2014). Statistical discourse analysis: Testing educational hypotheses with large datasets of electronic discourse. In H. L. Lim, & F. Sudweeks (Eds.), *Innovative methods and technologies for electronic discourse analysis* (pp. 285–303). IGI Global

Dweck, C. S. (2006). *Mindset: The new psychology of success*. Random House.

Dweck, C. S. (2013). *Self-theories: Their role in motivation, personality, and development*. Psychology press.

Firer, E., Slakmon, B., Dishon, G., & Schwarz, B. B. (2021). Quality of dialogue and emotion regulation in contentious discussions in higher education. *Learning, Culture and Social Interaction, 30*, 100535.

Gaßner, K., Jansen, M., Harrer, A., Herrmann, K., & Hoppe, H. U. (2003). Analysis methods for collaborative models and activities. In B. Wasson, S. Ludvigsen, & U. Hoppe (Eds,). *Designing for change in networked learning environments* (pp. 369–377). Springer

Gu, X., Wang, H., & Mason, J. (2017). Are they thinking differently: A cross-cultural study on the relationship of thinking styles and emerging roles in computer-supported collaborative learning. *Journal of Educational Technology & Society, 20*(1), 13–24.

Hod, Y., & Ben-Zvi, D. (2018). Co-development patterns of knowledge, experience, and self in humanistic knowledge building communities. *Instructional Science, 46*(4), 593–619.

Janssen, J., Kirschner, F., Erkens, G., Kirschner, P. A., & Paas, F. (2010). Making the black box of collaborative learning transparent: Combining process-oriented and cognitive load approaches. *Educational Psychology Review, 22*(2), 139–154.

Kapur, M., & Bielaczyc, K. (2012). Designing for productive failure. *Journal of the Learning Sciences, 21*(1), 45–83.

Kielstra, J., Molenaar, I., van Steensel, R., & Verhoeven, L. (2022). Supporting socially shared regulation during collaborative task-oriented reading. *International Journal of Computer-Supported Collaborative Learning, 17*(1), 65–105. https://doi.org/10.1007/s11412-022-09365-x

Nihalani, P. K., & Robinson, D. H. (2022). Balancing collaboration and cognitive load to optimize individual and group desirable difficulties. *Journal of Educational Computing Research, 60*(2), 433–454.

Ollesch, L., Heimbuch, S., & Bodemer, D. (2021). Improving learning and writing outcomes: Influence of cognitive and behavioral group awareness tools in wikis. *International Journal of Computer-Supported Collaborative Learning, 16*, 225–259. https://doi.org/10.1007/s11412-021-09346-6

Pollack, S., & Ben-David Kolikant, Y. (2012). Collaboration amidst disagreement and moral judgment: The dynamics of Jewish and Arab students' collaborative inquiry of their joint past. *International Journal of Computer-Supported Collaborative Learning, 7*(1), 109–128.

Rojas, M., Nussbaum, M., Guerrero, O., Chiuminatto, P., Greiff, S., Del Rio, R., & Alvares, D. (2022). Integrating a collaboration script and group awareness to support group regulation and emotions towards collaborative problem solving. *International Journal of Computer-Supported Collaborative Learning, 17*(1), 135–168. https://doi.org/10.1007/s11412-022-09362-0

Rosé, C., & Dimitriadis, Y. (2021). Tools and resources for setting up collaborative spaces. In U. Cress, C. Rosé, A. F. Wise, & J. Oshima (Eds.), *International handbook of computer-supported collaborative learning*. (pp. 445–460) Springer

Rosé, C. P. (2017). Discourse analytics. In C. Lang, G. Siemens, A. Wise, & D. Gašević (Eds.), *Handbook of learning analytics*. (pp. 105–114)

Schnaubert, L., & Bodemer, D. (2022). Group awareness and regulation in computer-supported collaborative learning. *International Journal of Computer-Supported Collaborative Learning, 17*(1), 11–38. https://doi.org/10.1007/s11412-022-09361-1

Tissenbaum, M., & Slotta, J. (2019). Supporting classroom orchestration with real-time feedback: A role for teacher dashboards and real-time agents. *International Journal of Computer-Supported Collaborative Learning, 14*, 325–351. https://doi.org/10.1007/s11412-019-09306-1

Trausan-Matu, S., Wegerif, R., & Major, L. (2021). Dialogism. In U. Cress, C. Rosé, A. F. Wise, & J. Oshima (Eds.), *International handbook of computer-supported collaborative learning*. (pp. 219–239)

Vogel, F., Kollar, I., Fischer, F., Reiss, K., & Ufer, S. (2022). Adaptable scaffolding of mathematical argumentation skills: The role of self-regulation when scaffolded with CSCL scripts and heuristic worked

examples. *International Journal of Computer-Supported Collaborative Learning, 17*(1), 39–64. https://doi.org/10.1007/s11412-022-09363-z

Weinberger, A., Marttunen, M., Laurinen, L., & Stegmann, K. (2013). Inducing socio-cognitive conflict in Finnish and German groups of online learners by CSCL script. *International Journal of Computer-Supported Collaborative Learning, 8*(3), 333–349.

Zimmerman, H. T., & Land, S. M. (2022). Supporting children's place-based observations and explanations using collaboration scripts while learning-on-the-move outdoors. *International Journal of Computer-Supported Collaborative Learning, 17*(1), 107–134. https://doi.org/10.1007/s11412-022-09366-w