

Converging on Key Topics for Collaborative Learning in K12 Practice Using the Delphi Method

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Abstract: We brought researchers and educators together to participate as panelists in a Delphi Method study and rate the importance of research topics in computer-supported collaborative learning for K12 STEM practice. At the end of the Delphi Method, researchers and practitioners converged on seven key topics. Researchers and practitioners will further explore these topics in the next project phase to develop resources to connect research to practice in classrooms.

Introduction

This poster focuses on one part of a larger project that is working to form small collaborative communities of researchers and practitioners creating relevant research-based materials for K12 teachers (Dragnić-Cindrić & Fusco, 2023). We resonate with this year's conference theme, "Learning as a cornerstone of healing, resilience, and community," as we investigate what and how educators and researchers can learn and create together. In this poster, we focus on how we determined key topics from collaborative learning (CL) research literature for translation into K12 STEM practice with researchers and practitioners. The project's next phase brings researchers and practitioners together to co-design and co-develop resources to connect CL research to classroom practice.

We convened a panel of researchers and practitioners to participate in three rounds of an adapted Delphi Method approach to determine key topics because it is known to be a method for building consensus. A strength of the Delphi Method is that it lets different perspectives be heard while maintaining the anonymity of the participants. Since we are working with two different groups, practitioners and researchers, it was crucial to hear perspectives from both groups and avoid the power dynamics that often characterize their interactions. Though we were interested in consensus, we were also interested in where there were different opinions. We are aware that in educational research, critical perspectives provide an important vehicle to discover gaps and facilitate change toward more equitable approaches. Our panel included researchers who were experts in computer-supported collaborative learning (CSCL) and teachers in different school settings (rural, urban, suburban), regional locations, and of different genders and races. The following research question guided this work: What are the important topics from CSCL literature that we should work to translate for practice? The topics we started with were identified through bibliometric work in an earlier project phase (Dragnić-Cindrić & Fusco, 2023).

Research framework

We used the Delphi Method, originally developed at the RAND Corporation. It was chosen as a pragmatic approach grounded in John Dewey's philosophical assumptions that social science research should be informed by real-world practice (Brady, 2015). It provides a rigorous, systematic approach that can be used with quantitative and qualitative data to gain consensus with a panel of experts. The Delphi Method has been used in various fields (e.g., health care) to summarize a topic of interest for informing policy, making decisions, and guiding practice. The method uses an anonymous format to bring in all voices, not just traditional power holders, with the goal of achieving consensus over rounds of questions that occur over time (Brady, 2015).

Methods

We recruited eight practicing classroom teachers or coaches. All the recruited teachers and coaches had extensive experience in the United States K12 practice (8-31 years), extensive experience in collaboration, and had either conducted research themselves or read research articles. All had Masters or doctoral degrees and professional certifications (e.g., National Board Certification). The five researchers on the panel have extensive research experience and publications in the field of CSCL and/or the Learning Sciences.

The Delphi method panel took place between January and May of 2023. Our surveys had a total of 16 questions in three blocks. The first block had absolute ranking questions about the CL research topics. Participants ranked each topic on a 4-point scale (relevant, somewhat relevant, somewhat irrelevant, and irrelevant). In the second block, there was a relative ranking question, where participants ranked the importance of each topic relative to the other topics. In the third block, there were three open-response questions: one question that asked about any additional topics the panelist thought should be included in the topic list, one that asked participants to share their reasoning for how they determined the importance of topics, and one question that asked participants

about anything else they would like to tell us about the topics or process. After each round, we calculated consensus similarly to Ubaidullah et al. (2020) and removed topics that did not reach consensus. In rounds two and three, we also added topics that were suggested by two or more panelists. Participants were given two weeks to complete the first two rounds and three weeks for the third round. After each round, it took approximately four weeks to analyze the data and create a report for the panelists about their topic rankings (Helms, 2016).

Findings

In Round 1, participants started with 12 research topics and reached consensus on seven that they considered important to K12 STEM CL. They were: classroom discourse; classroom orchestration and scripts; pedagogical content knowledge; socially-shared regulation of learning; active science learning; diversity, equity and inclusion (DEI); and argumentation. Through open-ended questions, they suggested we add “teacher preparation and professional development” and “student and teacher identity” to the topics and we did. With Round 1 results, we created the Round 2 survey. In it, we inquired about nine topics (i.e., seven topics that reached consensus, plus two new topics). At the conclusion of Round 2, panelists reached consensus on eight topics: classroom discourse; classroom orchestration and scripts; pedagogical content knowledge; socially-shared regulation of learning; DEI; and argumentation. The topic, active science learning, did not meet the criterion for inclusion in Round 3. With Round 2 results, we created the Round 3 survey with eight topics. Participants reached consensus on the following seven: classroom discourse; classroom orchestration and scripts; teacher preparation and professional development; socially-shared regulation of learning; DEI; student and teacher identities; and argumentation.

Qualitative analysis of the open responses revealed that panelists assigned high importance rankings to topics for several reasons. Panelists gave high rankings if the topic was relevant based on their own experiences through teaching, research, or both; if the topic connected to pedagogical knowledge for implementing CL in learning environments; and if there were relevant or applicable research articles. They noted the importance of topics that would help improve understanding about how to collaborate. In Rounds 2 and 3, they discussed the importance of DEI, and/or learner identities, and we noticed more panelists discussing the importance of topics connected to teachers’ pedagogical knowledge. Panelists ranked topics lower when they felt that the topic was not relevant for all students, not relevant for K12 or CL, or did not have relevant research articles.

Discussion

The modified Delphi Method was useful to show us both consensus and areas of divergent opinions and gave insight into what is important to practitioners in research articles. Our preliminary data analysis based on the three rounds of Delphi Method indicates strong agreements between practitioners and researchers on the importance of topics such as DEI, classroom discourse, and socially-shared regulation of learning. Whereas practitioners felt the topics of “pedagogical content knowledge” and “teacher preparation and professional development” were very important, the researchers did not prioritize them to the same level. However, in Round 3, they reached consensus on the “teacher preparation and professional development” topic. Similarly, while researchers felt topics of “classroom orchestration and scripts” and “argumentation” were highly important, practitioners did not find them as critical. In this study, the Delphi Method was an effective way to illuminate areas of agreement and where gaps persist between the researchers and practitioners, while giving equal importance to all panelists’ perspectives.

References

- Dragić-Cindrić, D., & Fusco, J. (2023). Re-Envisioning Bibliometric Analysis as a Tool for Transforming the Field. In *Proceedings of the 17th International Conference of the Learning Sciences-ICLS 2023*, pp. 1831-1832. International Society of the Learning Sciences.
- Brady, S. R. (2015). Utilizing and adapting the Delphi method for use in qualitative research. *International Journal of Qualitative Methods*, 14(5). DOI: 1609406915621381.
- Ubaidullah, N. H., Mohamed, Z., Hamid, J., & Sulaiman, S. (2020). The use of Delphi Technique in validating a teaching and learning model for enhancing students' computational thinking skills. *Universal Journal of Educational Research*, 8(12B), 8201-8213. DOI: 10.13189/ujer.2020.082624.
- Helms, C., Gardner, A., & McInnes, E. (2017). Consensus on an Australian nurse practitioner specialty framework using Delphi methodology: results from the CLLEVER 2 study. *Journal of Advanced Nursing*, 73(2), 433-447.

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