

Exploring the Definition and Measurement of Collaborative Problem Solving

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Abstract: Current CPS constructs and assessments designed to provide insights regarding proficiency with CPS skills have focused largely on the CPS skills required for temporary teams to solve problems in situational or temporary contexts. My research is focused on designing and measuring a construct that addresses the more longitudinal aspects of team effectiveness and to better understand the role that behaviors and cognitive skills play in influencing both the team effectiveness and task effectiveness aspects of CPS.

Vision

Collaborative problem solving (CPS) is an important 21st century skill, required for success along the entire Kindergarten to Career continuum. Students are expected to collaborate and solve problems from the playground to the classroom. Collaborators in the workforce are tasked with building teams and solving problems across a wide range of fields, and in both formal and informal settings.

My research aims to build on the current state-of-the art work developed by groups such as PISA (OECD 2017) and ATC21s (Hesse, Care, Buder, Sassenberg, & Griffin, 2015) to design a construct and tasks that include and measure a more comprehensive range of behaviors and skills, and to then validate this construct and these tasks against real-world outcomes, using real-world contexts. My goal is that the insights gleaned from this work will inform the ability of those working in the learning sciences to build better instruments for the classroom and in doing so provide more authentic, meaningful, and actionable insights regarding proficiency and progress with these skills for learners and teachers than the field has been able to provide previously.

To this end, I have developed a construct model of CPS that addresses aspects of team effectiveness and task effectiveness as supported by a range of behaviors and cognitive skills, and aligned with real-world outcomes. This new model is designed to provide insights about the ability of an individual, as well as a team, to succeed in more authentic, complex, and real-world contexts. This new model was used to create tasks designed to elicit a range of both behaviors and cognitive skills required to support both team and task effectiveness in an online, game-based, CPS assessment, “Circuit Runner.” Four consecutive studies have been designed, and two completed, to explore the validity of both the framework and the assessment tasks.

The CPS I and II studies focused on administration of different iterations of the “Circuit Runner” game to different populations with the inclusion of additional instruments (e.g., pre-and a post-survey, CPS-focused situated judgment test (SJT), HEXACO-IR self-report survey) to explore the measurement of CPS skills across instruments. Five subskills from the CPS construct were measured within the game (e.g., perspective taking, persistence, strategy, goal orientation, problem feature awareness) with three of those sub skills measured in the SJT (e.g., perspective taking, strategy, problem feature awareness). Correlation and further data analytics provided the preliminary confirmation that these are valid and reliable measures. We continue to explore the insights provided by the data in the game.

The CPS III study will be similar to CPS I and II and include a ‘post’ version of the game played at a later date to explore tracking of these skills over time. CPS IV Study involves the administration of a Team Effectiveness Peer Review Tool (TE-PRT) designed to measure the comprehensive set of Team Effectiveness components of the CPS construct at both the individual and team levels, both within and across teams. The goal is an expanded exploration of the skills with varying types of instruments within and across teams, over time, and with the additional insights provided by real-world individual and team performance metrics.

My hope in sharing my current work with the learning sciences community is to glean insights that might inform construct, task, or study design. I would also benefit from a greater understanding of the perceptions of the learning science community regarding the importance/limitations of measurement of complex skill sets such as CPS and the advantages/disadvantages of employing technology for these purposes.

References

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