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Measuring Collaborative Problem Solving Capability Using Peer Assessment

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Abstract

Measuring collaborative problem solving (CPS) involves two or more people collaborating to solve a problem and assessing each person's contribution to the collaboration. Accurate measurement of CPS capability is not only important in itself, but also in order to develop education and training programs for enhancing the capability. However, there are two weaknesses in most existing CPS measurement tools. One is that the assessment is limited to each individual's contribution to the collaborative process without accounting for their contribution to the final output. Another drawback is that there's a limitation to the problems that are utilized. Automatic grading is possible when existing problems are used; however, using new problems requires experts to do the grading and is, therefore, costly. Addressing these two drawbacks, we modified the PISA 2015 framework to account for each individual's contribution to the final output, and introduced peer assessment. To test the validity of our proposition empirically, we had 50 college students perform two tasks in different groups, and analyzed the results. We found that there was a very high correlation between the existing CPS measurement score and our modified score, and peer-assessed CPS scores approximated expert-assessed scores. Furthermore, there was a significant correlation in the modified CPS scores between the two tasks, suggesting that our method is consistent across different tasks and groups. These results suggest that the modified CPS measurement method and adopting peer assessment can be used to measure CPS without incurring cost and utilizing various problems.

Keywords: collaborative problem solving, peer-assessment, assessment, problem solving, collaboration