

# Automated Intelligent Group Suggestions Based on Students' Conceptual Understanding

Elisabeth Kimmich Mitchell, Toby Dragon<sup>1</sup>

<sup>1</sup>Research Advisor, Department of Computer Science, Ithaca College 953 Danby Rd, NY USA  
{ekimmichmitchell, tdragon}@ithaca.edu

## Abstract

Instructors seeking to promote collaborative work in the classroom have always faced the challenge of creating small student groups on the fly. While instructors could potentially make groups that they think would be ideal, this process would be time consuming and impractical. More likely, instructors create random groups based on self-selection or proximity of students. We argue that better groups can be identified if the students' knowledge of the relevant core concepts is taken into consideration. Thus, our system provides a practical approach to potentially improve the productivity of in-class group collaboration.

We have created a system to quickly and dynamically recommend student groups for short-term collaboration. Our system calculates students' knowledge using what we term the concept graph, which is similar to a concept map. The concept graph is a directed acyclic graph that highlights specific concepts taught in the course and their relationship to one another. Students' performances on assigned assessment materials are calculated and stored in their concept graph. Instructors can request group suggestions based on various criteria related to the students' estimated conceptual understanding. The system uses generic suggestion methods to create different group types based on various pedagogical theories we find to be salient to group learning. This system enables different combinations of grouping methods in different orders to allow instructors to personalize and explore the relative advantages of various group types. We plan to experiment with the above-mentioned group types with real students during the rest of this semester. We also invite others to explore our open-source software, inquire about collaboration, and consider their own grouping methods by visiting our repository:

[github.com/tobydragon/ConceptKnowledgeCalculator](https://github.com/tobydragon/ConceptKnowledgeCalculator).