

Role-based Group Formations and Interactions to foster Collaborative Learning in Large Classrooms

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Problem Definition

Collaboration in large or virtual classes is challenging

- Group formation of a high number of students that are spatially, or geographically distributed
- High noise levels and distraction, or high resource demands



→ Short-term group activities

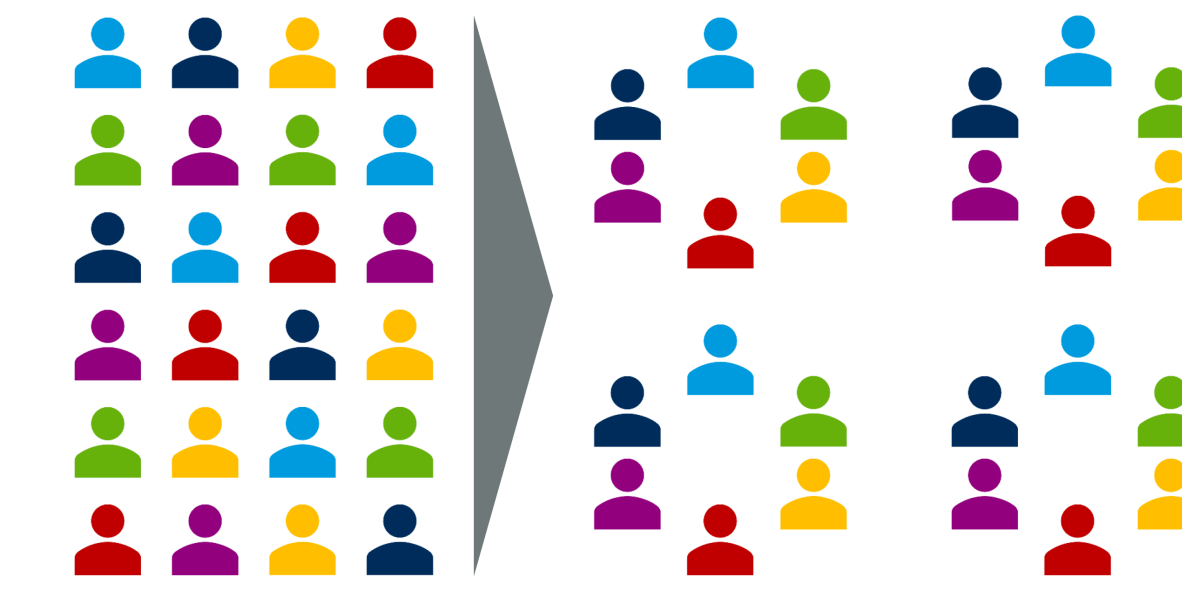
Group Formation

Choose between five *group formation* algorithms

- *random, bestToWorst, similar, sameAnswer, differentAnswer*

Set one of the following settings

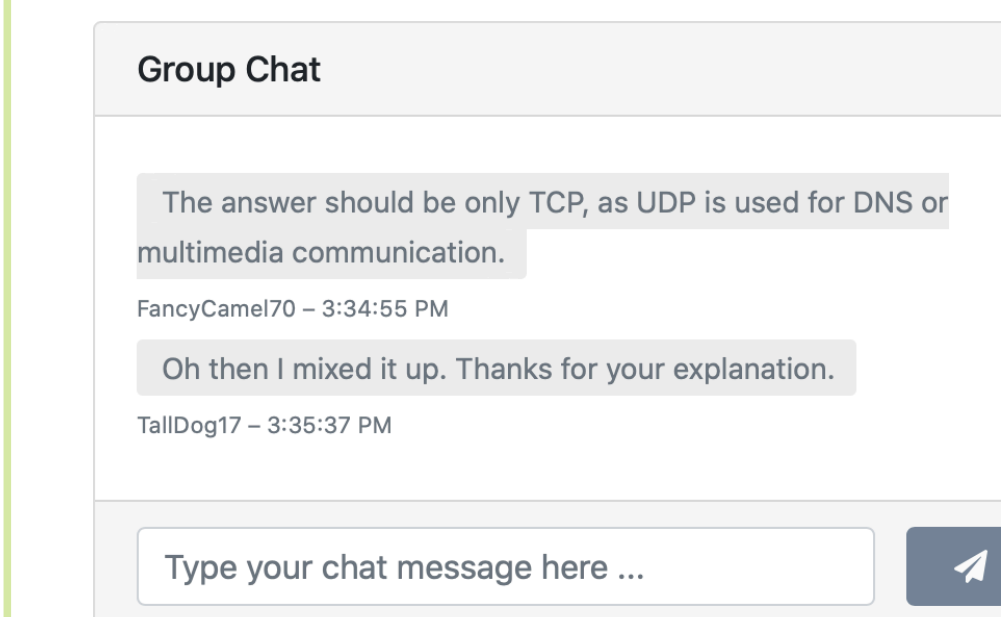
- *groupSize* or *numberOfGroups*



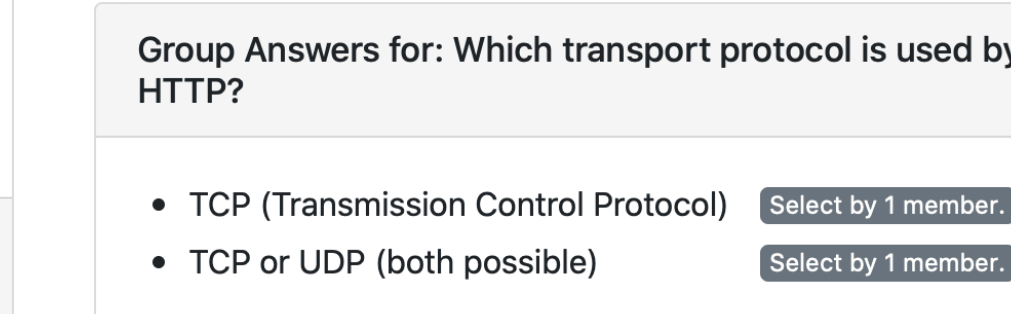
Group Interaction Blocks

Use different group interactions

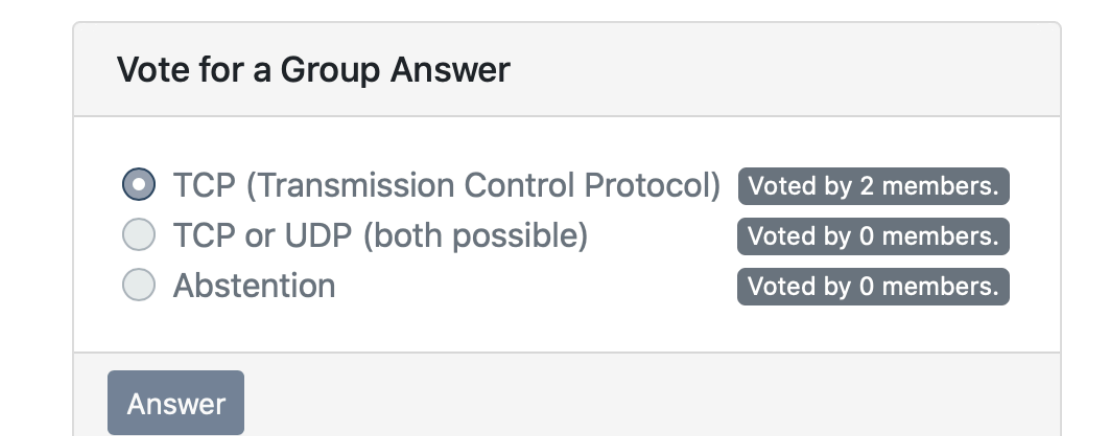
Chat



Present Group Answers



Group Voting



Usage of the Role-Concept [1]

Pro

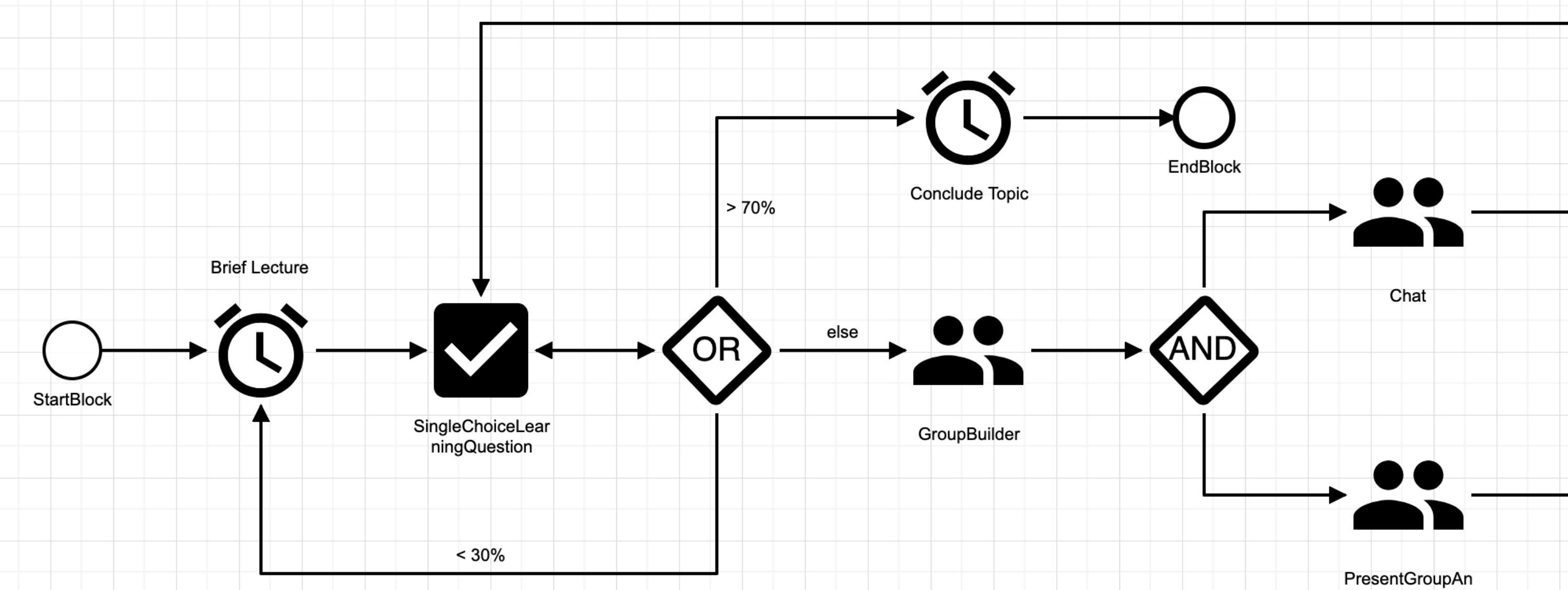
- + More intuitive implementation of *different behavior for current user role / group* (e.g., moderator assignment)
- + Separation between data provided by the metamodel and runtime: *Extend functionality by extending metamodel*

Contra

- Less "conventional" implementation

Example Scenario

Implementation of *Peer Instruction* [2]:



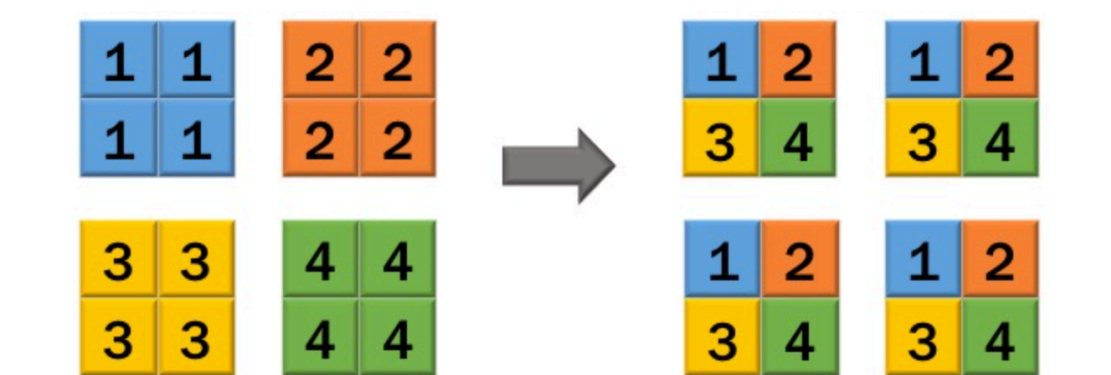
Lessons Learned & Future Work

Create customized collaborative group scenarios [3]

- Execution in both virtual and traditional settings
- CL is an essential part in Software Engineering: *Prepare students for teamwork, even during COVID-19 pandemic*

Investigation of further use cases

- *AudioVideoChat*
- Implementation of *Jigsaw Learning*



[1] T. Kühn, M. Leuthäuser, S. Götz, C. Seidl, and U. Aßmann. *A metamodel family for role-based modeling and programming languages*. SLE'14, ACM, 2014.

[2] N. Lasry, E. Mazur, and J. Watkins. *Peer instruction: From harvard to the two-year college*. American journal of Physics, 2008.

[3] T. Kubica, I. Shmelkin, and A. Schill. *Towards a Development Methodology for Adaptable Collaborative Audience Response Systems*. ITHET'19, IEEE, 2019.