Encouragement of Collaborative Learning Based on Dynamic Groups

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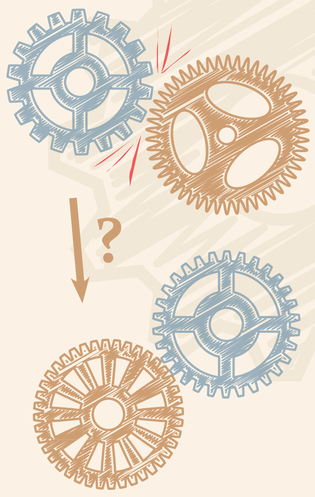
Motivation

- We **do not** know
  - what makes collaboration really effective
  - how to join the users into effective groups
- We want users to collaborate **effectively**
  - it is necessary to help them find appropriate collaborators
- **Collaborative learning** (CSCL)
  - group formation process can significantly influence collaboration



How others solve group formation problem

- Several methods and techniques were applied to group formation: particle swarm optimization, ontologies, genetic algorithms
- **But** these methods
  - usually use only one source of information about students
  - do not consider actual context
  - suppose that a teacher knows which attributes make collaboration more effective

Our method

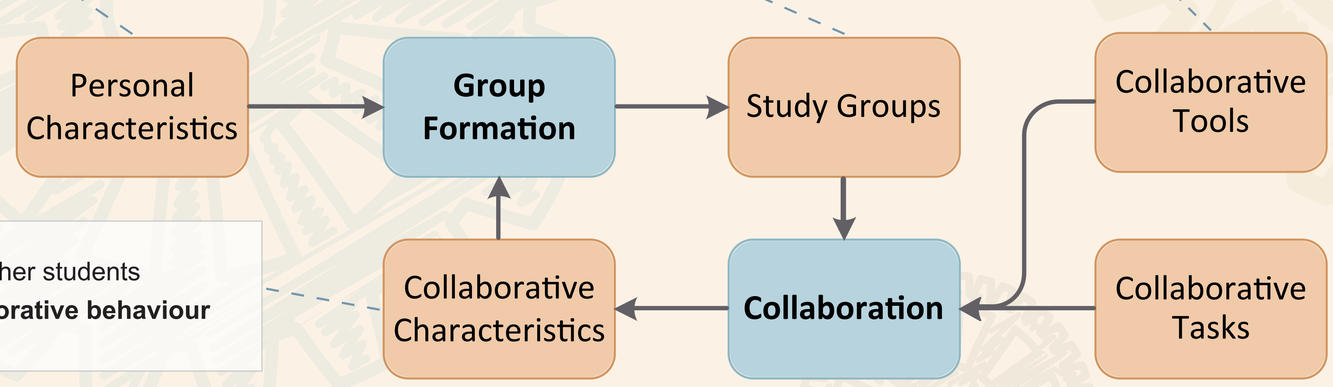
- Creating **dynamic short-term** study groups
- Design a collaboration platform which allows these groups to collaborate efficiently
- Basic idea: derived from the **Group Technology** approach

- Student's knowledge
- Interests
- Age, gender etc.

Activity	Student 1	Student 2	Student 3	Student 4	Student 5
Warn of mistake	1	1	0	0	0
Accept warn of mistake	1	1	0	0	0
Write general message	0	0	1	0	0
Ask for explanation	0	0	0	1	1
Give explanation	0	0	0	1	1
Propose action	0	0	0	1	1
Accept action	0	0	0	1	1
Write praise	0	0	0	1	0

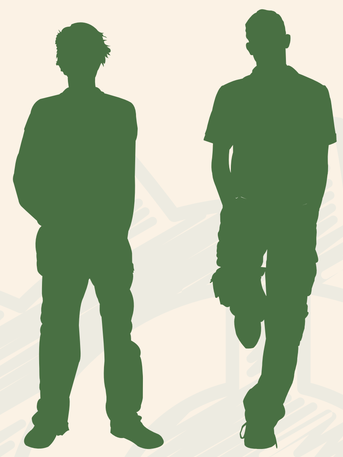
- Text editor
- Graphical editor
- Categorizer
- Semi-structured discussion

- Friendship with other students
- **Student's collaborative behaviour**

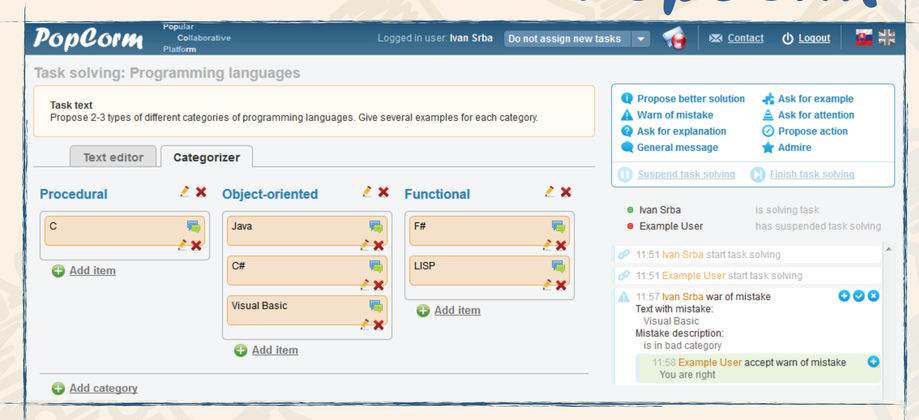


Evaluation

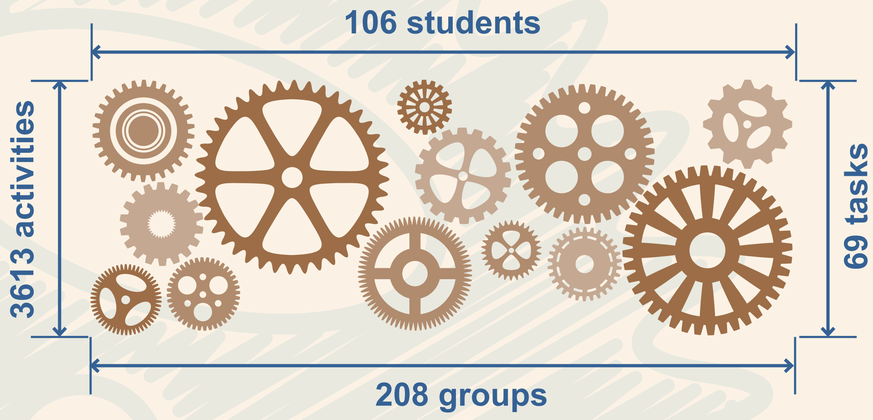
- Popular Collaborative Platform – **PopCorm**
- Short-term controlled experiment
- Long-term experiment
  - The 8-dimensional evaluation of the groups created using our method was compared with a **reference method** (k-means clustering) and randomly created groups
  - ANOVA: p-value 0.0048



PopCorm



Long-term experiment statistics



Comparison of achieved results during the long-term experiment

Groups created	Average evaluation	Feedback
By the proposed method	0.459	4.01
By the reference method (k-means clustering)	0.392	3.55
Randomly	0.422	3.29

Contribution

- Our method considers its iterative application
  - in contrast to the existing methods for group formation based on GT approach
- Automatic learning
  - which collaborative characteristics are typical for students
  - which characteristics should be combined together to achieve more effective collaboration
- Whole approach is not limited only to the CSCL domain

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PeWe@FIIT personalized web group