

# A Study on Influence of Students' Personal Characteristics on Collaborative Learning

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## Motivation

- **Educational** domain is influenced by new trend of teaching 21<sup>st</sup> Century Skills
  - collaborative, communication and social skills
- Methodologies such as **Communities of Practice** and Contributing Student Pedagogy
  - shift partial responsibility for learning from the teacher to students themselves
- We support students by an **adaptive educational system** which makes this shift easier
  - it is necessary to determinate how students' **study, personal and collaborative characteristics** influence preconditions of these methodologies

## Characteristics

- **Study characteristics**
  - study achievements from Academic Information System
- **Personal characteristics**
  - psychological questionnaires Big Five
  - neuroticism, extraversion, openness, agreeableness and conscientiousness
- **Collaborative characteristics**
  - taxonomy of collaborative learning skills by McManus and Aiken
  - creative conflict, active learning and conversation

Students with better study results solve less tasks

## Overall activity

- Students with better study results
  - solve less tasks (correlation 0.201)
  - but have higher average evaluation per task (0.254)
  - interact more with learning objects (0.180)
  - add more annotations (0.249)
- Students with high score of conscientiousness
  - perform more activities with learning objects (0.199)

## Correctness of created solutions

- Students with better study results
  - have higher pedagogue's evaluation of created solutions (0.082)
  - exchange more information (0.196)
  - are better in argumentation and reaching consensus (0.111)
- In addition, all collaborative characteristics positively influence the correctness of created solutions

## Students' self-regulation and motivation

- Students with better study results
  - maintain more often mutual understanding (0.193)
- Students with high level of extraversion
  - maintain more intensively mutual commitment, e.g. praise other group members for their activities (0.181)

## Task and time management

- Students with better study results
  - share activities more evenly (0.233)
  - collaborate more fluently (0.135)

## Evaluation and providing feedback

- Students with better study results
  - provide more evaluations of learning objects' usefulness (0.262) and difficulty (0.275)
  - provide more accurate evaluation (0.156)
- Students with high level of agreeableness
  - provide more often explicit feedback (0.134)

## Conclusion

- It is important to provide students with the educational tools for adaptive collaboration support
- We transformed five identified preconditions of modern methodologies (e.g. Communities of Practice) to particular **analyses of data available in educational systems**
  - how various students' characteristics influence the collaboration process
- We can provide **personalized support** for students in different aspects
  - group formation, finding appropriate peer or recommending learning objects

Detailed statistics of the analyzed educational data obtained from educational systems PopCorm and ALEF over a period of 12 weeks

System	Metric	Value	Additional notes
Both	Number of students	129	Number of students who actively used both systems.
PopCorm	Number of groups	254	Additional 35 groups were created but students were not able to start collaboration.
	Number of activities	3,763	Each activity corresponds to one sent message in the semi-structured discussion.
ALEF	Number of interactions with learning objects	55,483	The most used interactions are visiting learning object (44,848) and answering question (5,238).
	Number of annotations	4,539	The most used annotations are highlights (1,669) and tags (1,494).
	Number of learning objects' usefulness evaluation	2,235	The most used evaluations are useful content (1,277) and neutral rating (805).
	Number of learning objects' difficulty evaluation	2,274	The most used evaluations are relatively easy exercise (895) and moderately difficult (741).

Data integration schema with anonymization used

