universität innsbruck

Department of Computer Science

STI INNSBRUCK

Does the organisation of study groups into different knowledge levels improve the performance in a Bachelor degree course?

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Outline

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Introduction & Motivation

- Study groups are applied more and more in practice

  Because they: improve communication and understanding (“peer-teaching”), bring better scalability and interactivity,

  But there are challenges e.g. one or few students do the work and the rest does not learn, “stronger” students disengage up to leaving the course, studying with “friends” may be not the most optimal way

- The ways to organize the study groups most efficiently are not well studied in the literature

- Heterogeneity among students will increase even more as more students go to the university & with measures such as admitting the students without the entrance exams

Research Questions

Main research question: ***Will the organization of the study groups according to the students' competence levels, i.e. students with similar competence levels joined into the same study group versus other ways to form a study group, lead to better learning outcomes for all students at a Bachelor degree course?***

Secondary research question: ***Does construction and maintenance of a learning journal by the students lead to a more positive attitude and better learning outcomes in the course?***

Case Study Settings - Approach

Arranging students in the study groups of various knowledge levels, based on pre-testing outcomes.

Applying 2 methods: learning journal and questions in the forum.

Evaluation is based on:

- the **lecturers' perspective**: evaluations of performance, observations,
- the **students' perspective**: feedback, self assessment, survey at the end of the course.

Case Study Settings

Course: VU "**Booking and Yield Management**", SS 2018, 2SSt and 4 ECTS course blocked in 5 days over 2 weeks

Part of joint study programme ***Bachelorstudium Wirtschaft, Gesundheits- und Sporttourismus*** of the University of Innsbruck and the UMIT - The Health & Live Sciences University - located in ***Landeck***

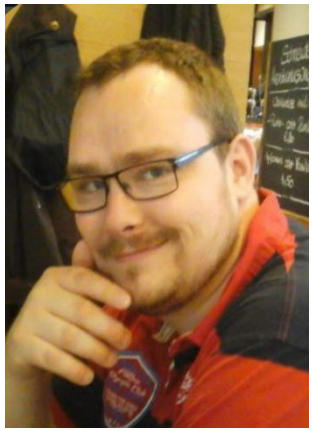
***Students*: 74**, split in 3 groups (27, 24 and 23 students)

Course leaders:

Ass.-Prof. Dr. Anna Fensel (STI)
Umutcan Simsek (STI)

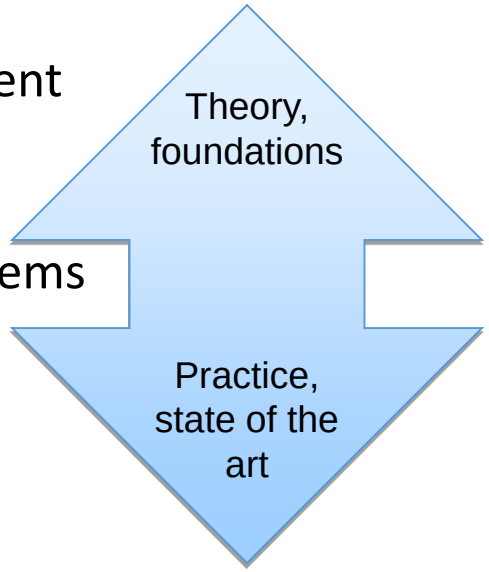
und guest lecturer

Benjamin Reinicke (Rateboard)



Course VU “Booking and Yield Management” – Contents of its 5 Days

1. Introduction, History and Theory of Revenue Management
2. Estimation, Forecasting and Overbooking
3. Empirical Booking and Yield Management: Booking Systems
4. Structured Data and Action: Semantic Mark-up
5. Direct Booking: Chatbots



Notensystem – Wofür werden welche Punkte vergeben?

a) Gruppenarbeit (bis 60 Punkte), 4 Mal 15 Punke,

b) Einzelarbeit (bis 40 Punkte):
20 für Individuelle Arbeit und 20 für Individuellen Abschlusstest.

c) Zusätzliche (bis zu 25) „Bonuspunkte“ für:
- Fragen in das Forum zu stellen
(eine Frage stellen und für drei gute Fragen von anderen stimmen – die beste Frage wird beantwortet / diskutiert am nächstes Seminar),
- Führen eines Lernjournals, und
- „Bonus“ Übungen mit dem „Extra-Schwierigkeitsgrad“ zu lösen.

Für Kursteilnehmer, die an den ersten vier Tagen sehr gute Leistungen erbringen und für das Bestehen genügend reguläre Punkte und Bonuspunkte sammeln, wäre dann der Abschlusstest nicht mehr erforderlich.

Notensystem: Punkte zur Note

Der Kurs ist bestanden, wenn 60% der Punkte erreicht sind.

Punkte in %	Note
90-100	1
80-89	2
70-79	3
60-69	4
0-59	5

Wir werden Sie während des Semesters über Ihre Fortschritte auf dem Laufenden halten.
Wenn Sie immer noch Zweifel haben, fragen Sie uns.

Resulting Groups

The students have been formed in 22 study groups of 3 students each, on the basis of the individual scores in the initial test (see Appendix A).

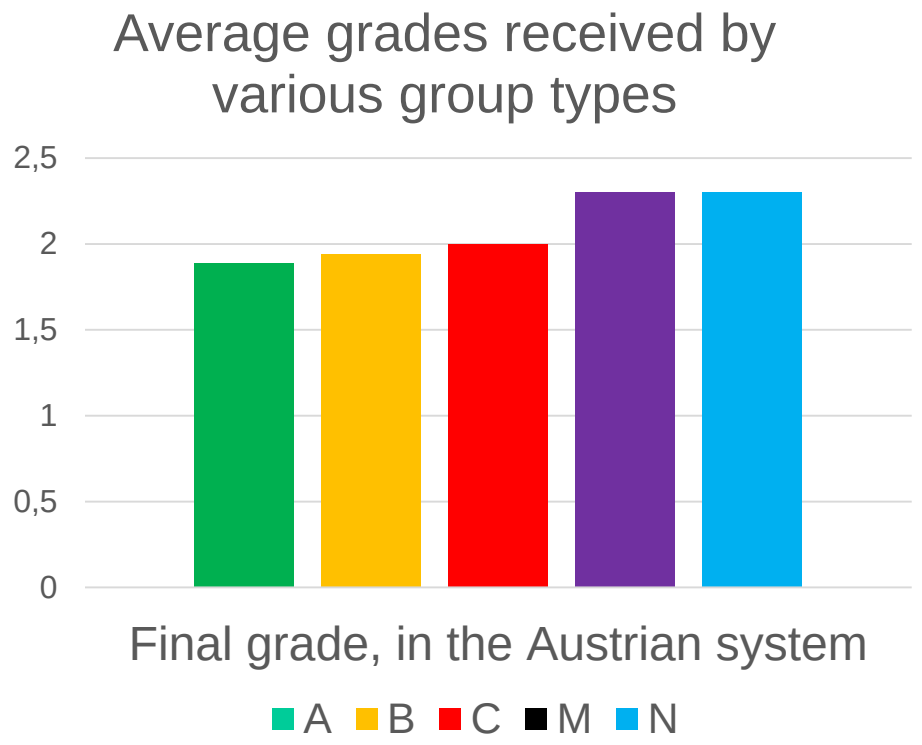
We use the following notation for the study groups:

A – "stronger" study groups,
B – "average" study groups,
C – "weaker" study groups,
M – mixed study groups (have 1 "weaker" student, 1 "average" student, and 1 "stronger" student),
N – study groups created in a natural way, by the students themselves.

Correspondingly, 3 A study groups, 5 B study groups, 2 C study groups, 4 M study groups and 8 N study groups have been formed.

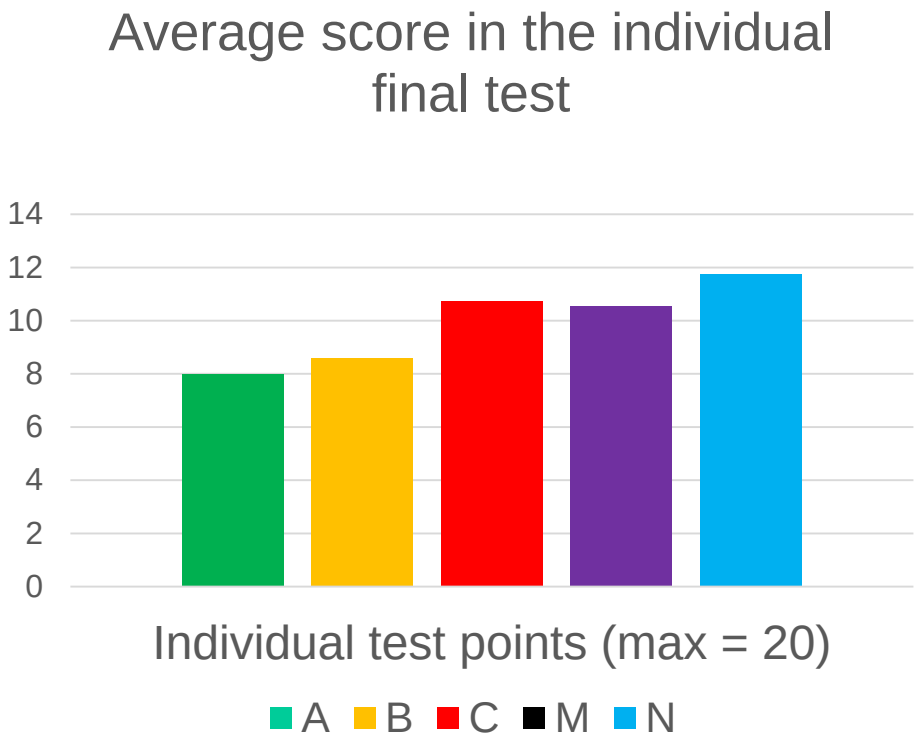
Results: Study Performance

Homogeneous study groups (A, B, C) have achieved **better academic grades** than the heterogeneous study groups (M and N).



Results: Individual Final Tests

In the **individual final tests (when taken)**, the A and B study groups have scored the worst, while the study groups C, M and N scored better.

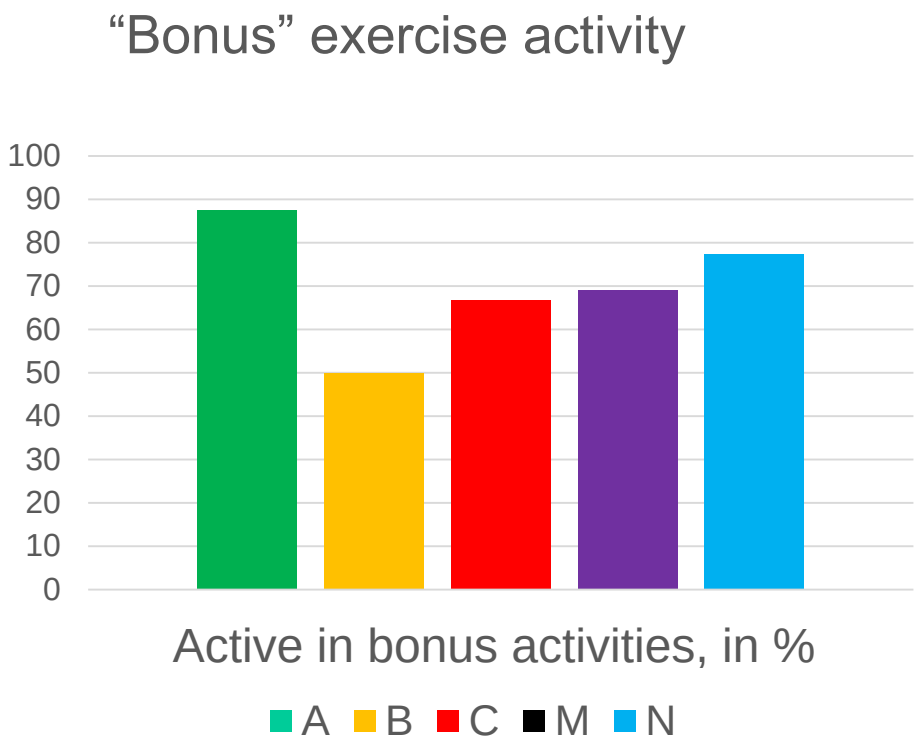


Results: Activity in “Bonus” Exercises

“A” students were most **active with doing the bonus exercises**

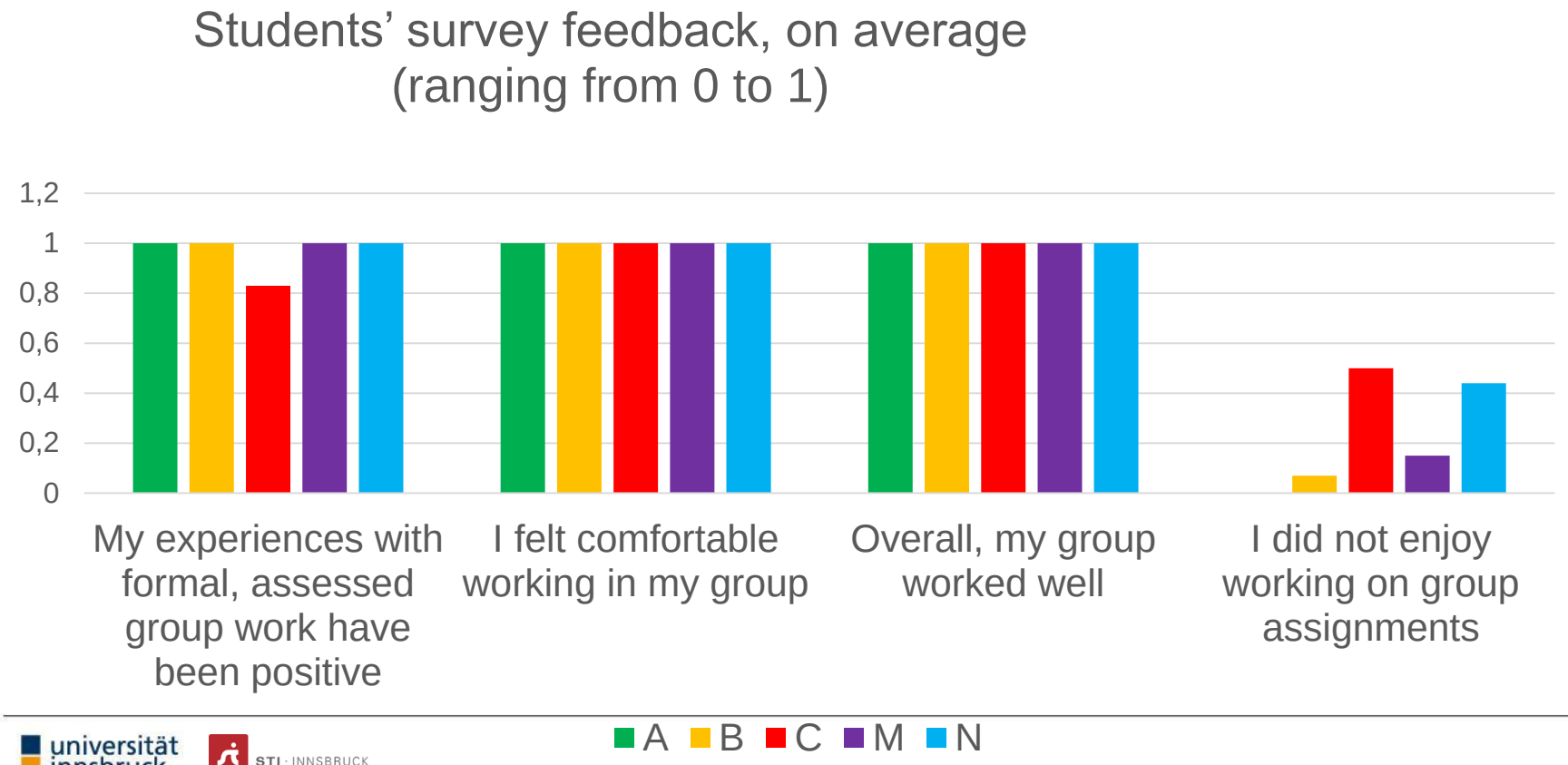
- as expected – probably because it was easier for them to follow the course and they had more time, and also because they were more extrinsically motivated.

While “B” students were least active.
33 active message threads in the forum.



Results: Satisfaction with Study Group Work

Students in overall appreciated study group work, however study **groups C and N had difficulties running it**, up to the point that many of them did not enjoy the study group work.



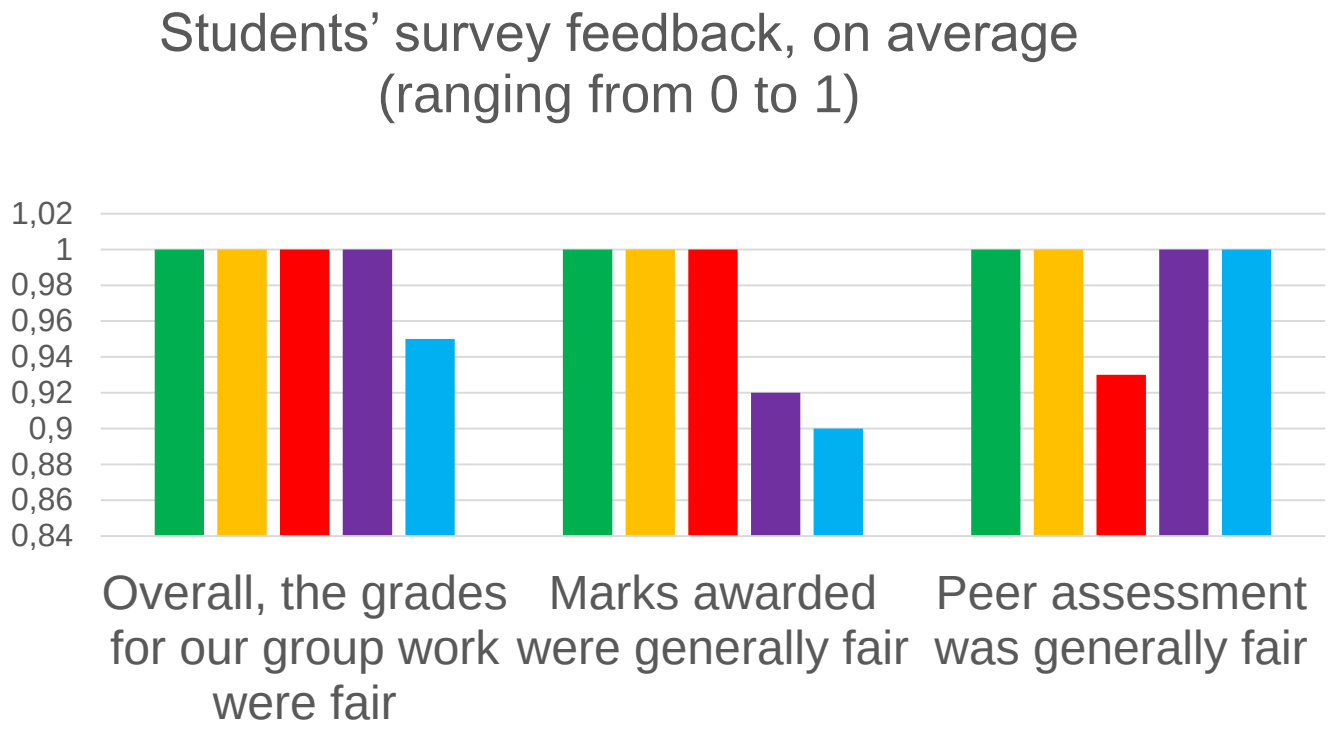
Results: Students' Perceived Working Load

Weaker study groups have had substantial difficulties in distribution of the work among themselves, as well as with problem solving. Their members have been **undertaking a lot of work individually**.

Students' survey feedback, on average
(ranging from 0 to 1)

Results: Students' Perceived Fairness of Grades

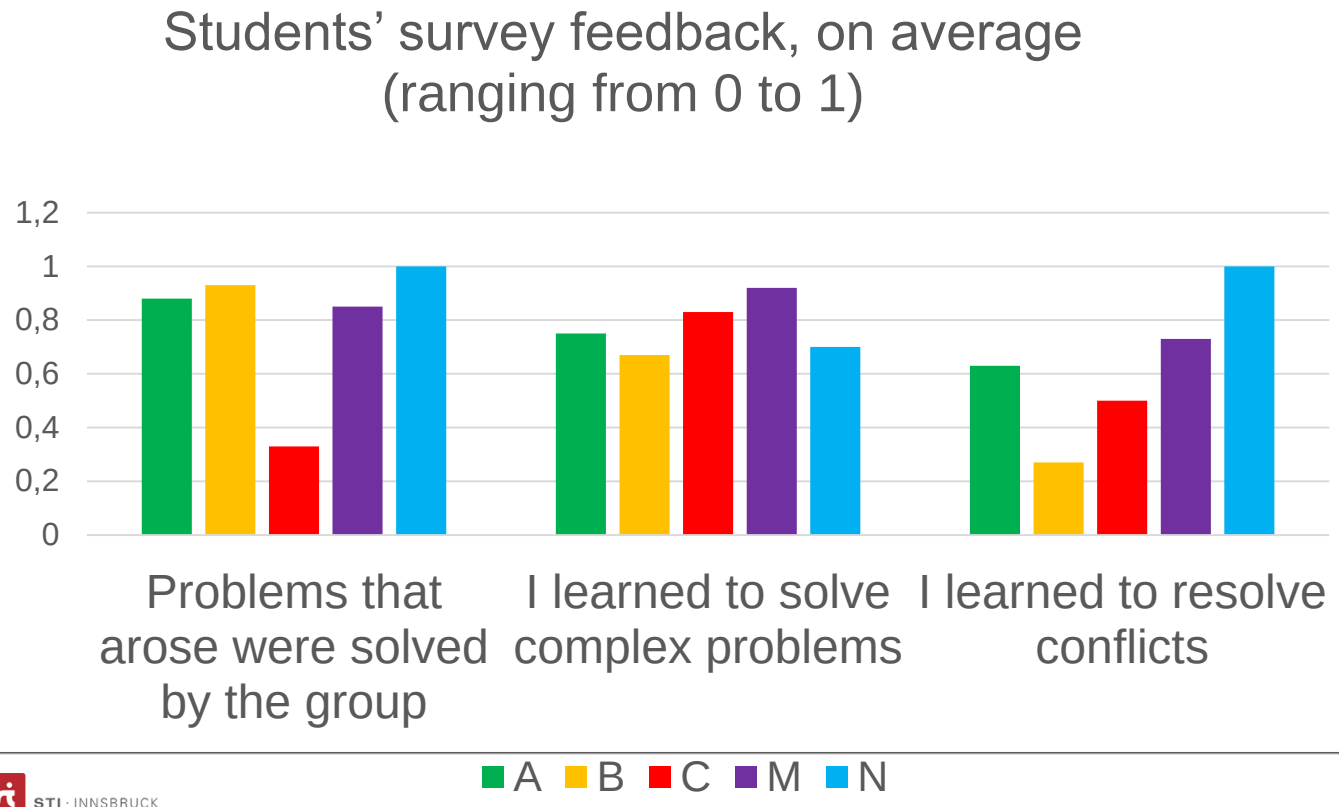
Homogeneous study groups assess the grades slightly as **more fair** (in fact, 100% fair).



Results:
Students' Perceived Problem Solving Competencies

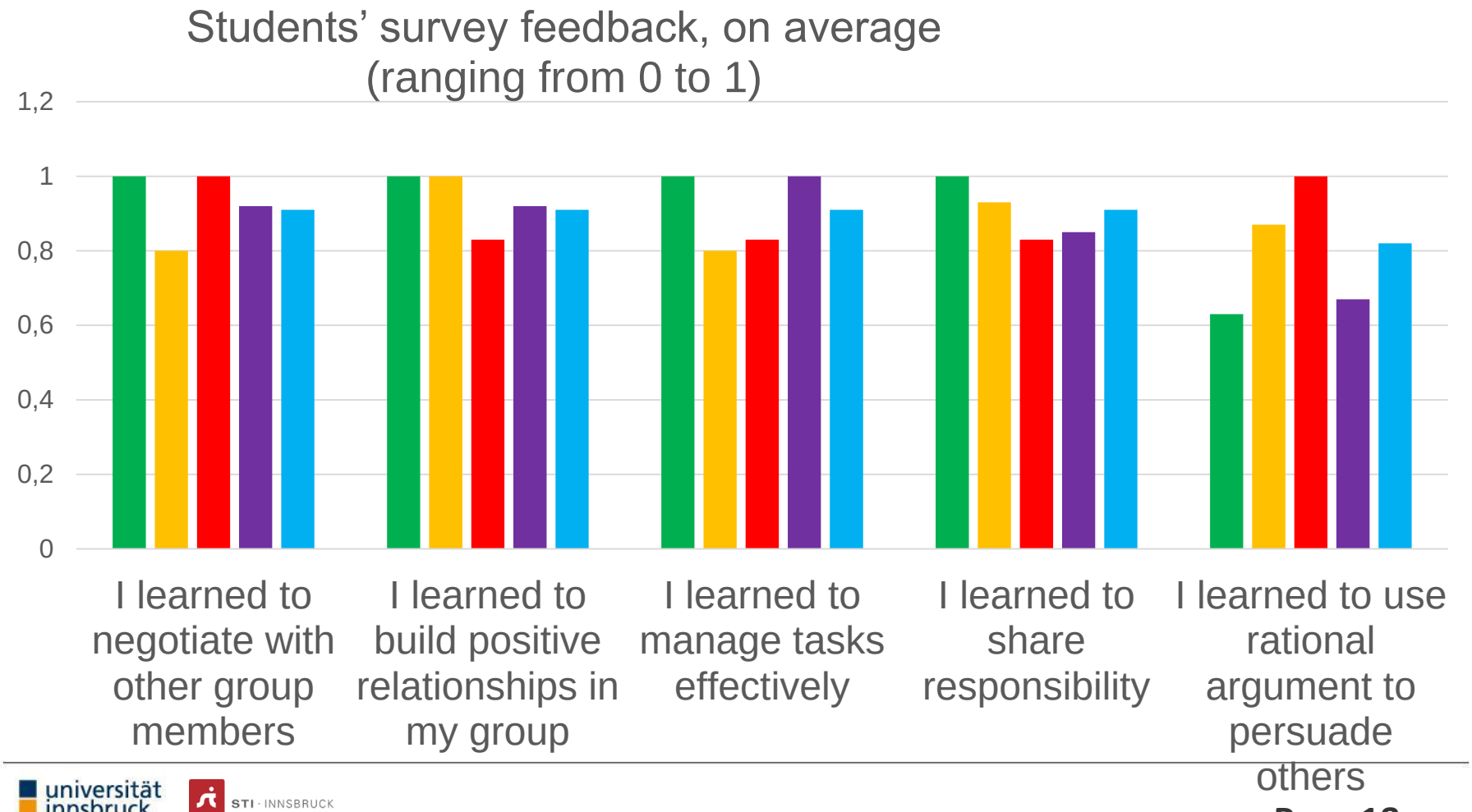
C and M study groups have self-reported their level of **knowledge had higher increase**.

The **conflict solving skills** are best gained in **heterogeneous study groups (M and N)**.



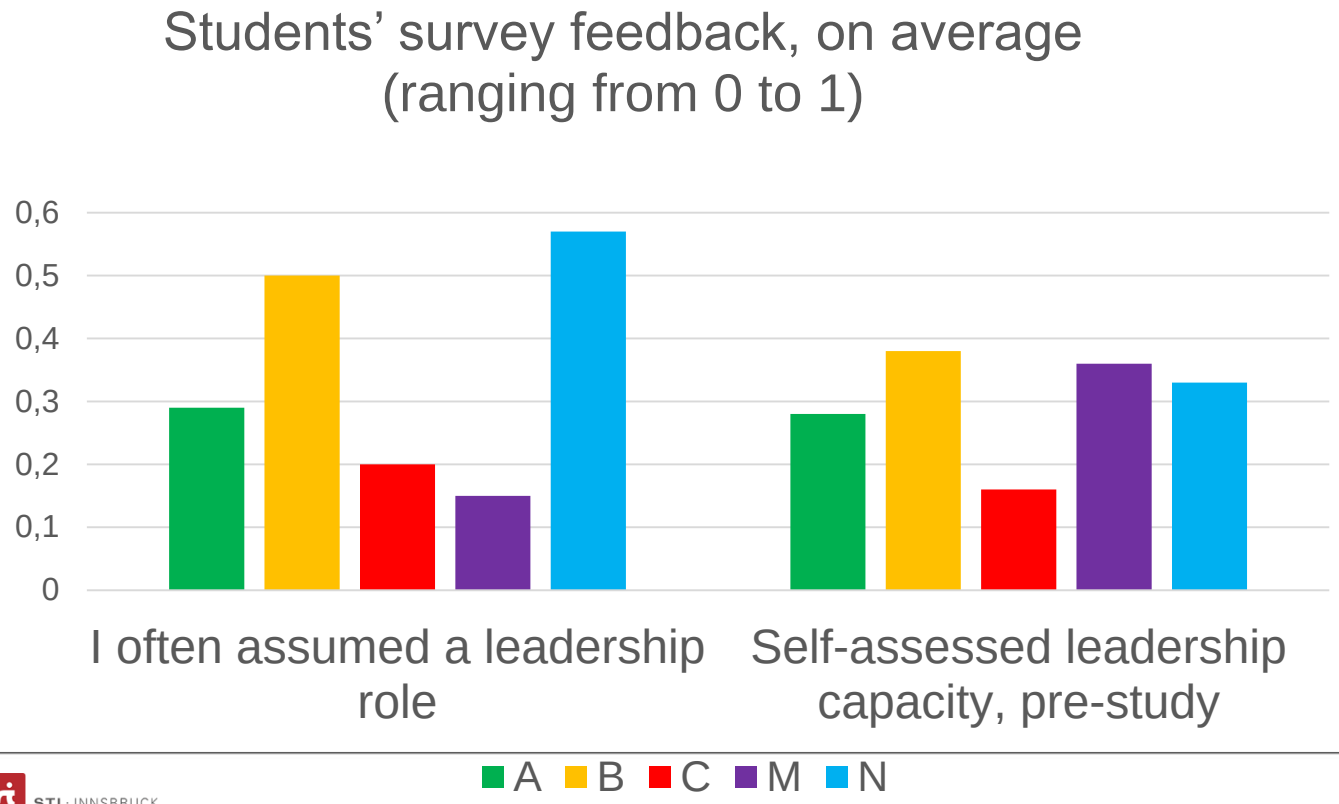
Results: Students' Perceived Gained Other Skills

With respect to gaining the skills towards **more positive cooperation style, the study groups A and N** were performing the best.



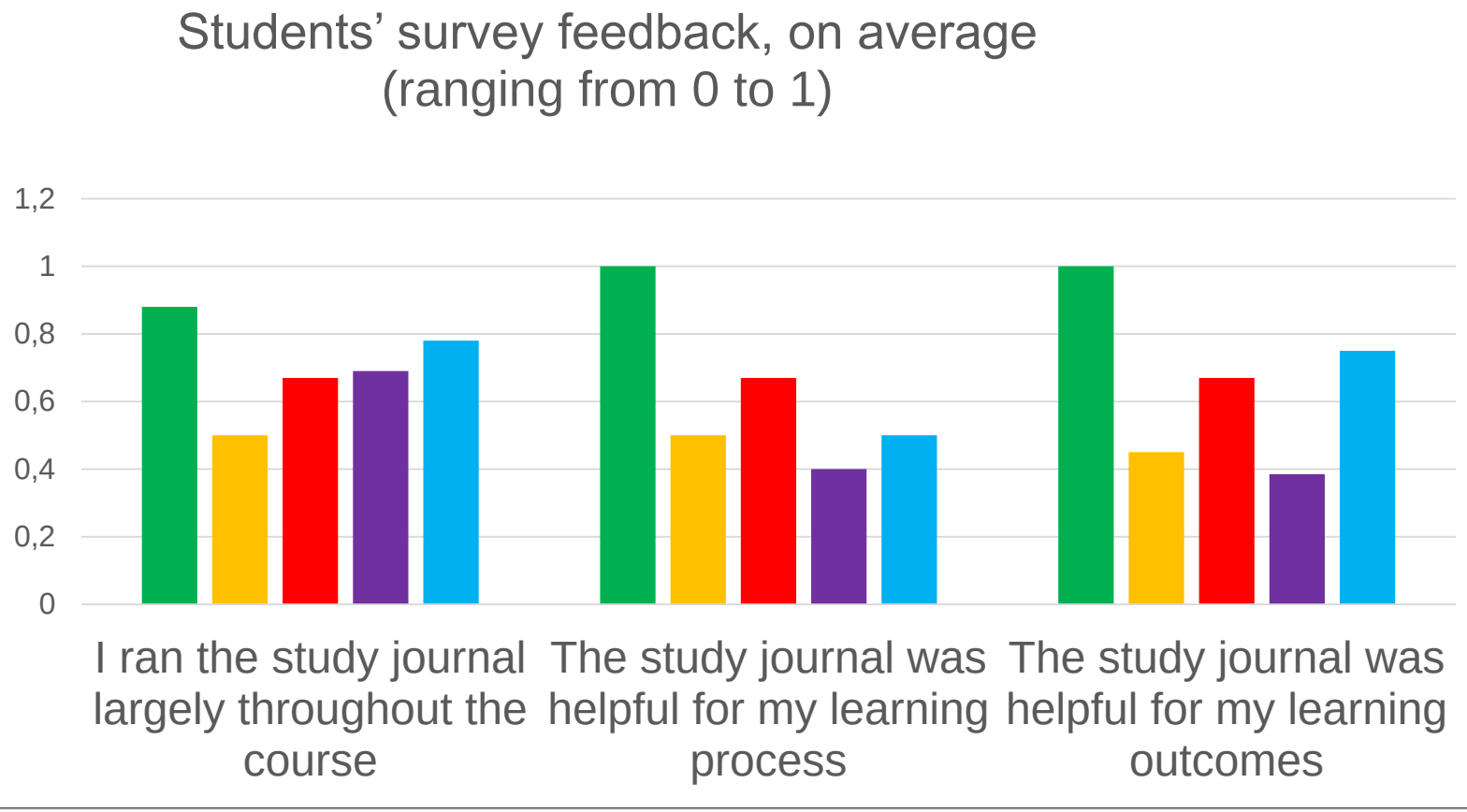
Results: Students' Perceived Gained Leadership Skills

The study groups that had the most of its members reporting themselves to be **activated as leaders** were **N and B groups**.
The study group work has changed the expectations in the leadership characteristic **for M and N groups**.



Results: Students' Reported Study Journal Usage

The learning journal was taken up at the **best by the A study groups** and at the **least well by B study groups**.



Conclusions

The deployed study groups **improve the performance and should be recommended.**

Especially in the starting semesters, when students do not know with whom they could work best.

Different methods work differently for every student types, no "one size fits all". We should approach the vision of **personalized education** (similarly as in the vision of "personalized medicine").

Improvements can be introduced, such as:

- placing **more weight on the individual knowledge in the evaluations** (in a balanced way though!),
- introduction of measures for the **management of the stress** that this method causes unavoidably for the "weaker" groups
  e.g. building "mixed" groups with "medium" and "weak" students instead,
- making the **students testing and group assignment as well as the tests in an automated way**.