

To block or not to block:

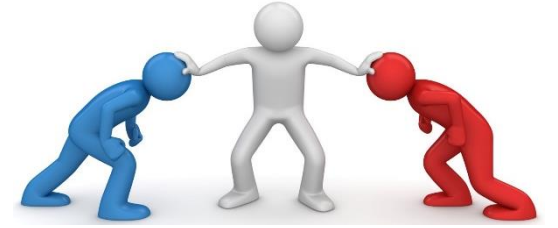
Does teaching delivery method affect students' performance and learning experience?

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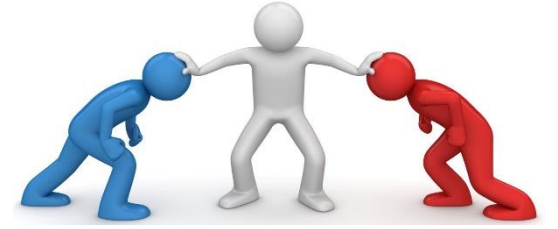
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To block or not to block: motivation

- » Focus on teaching delivery method and students'
 - » Assessment performance
 - » Learning experience
- » 2 main questions
 - » Does block teaching affect assessment performance?
 - » Does block teaching affect students' learning experience?
- » 2 ends of the spectrum
 - » Block teaching: a whole module delivered in two continuous weeks
 - » Conventional teaching: a few hours of teaching per week throughout the semester
- » 2 main reasons for block teaching
 - » Global delivery (Edinburgh, Dubai, Malaysia, China, Portugal, Russia, Azerbaijan)
 - » Anecdotal evidence on students' preference for block teaching



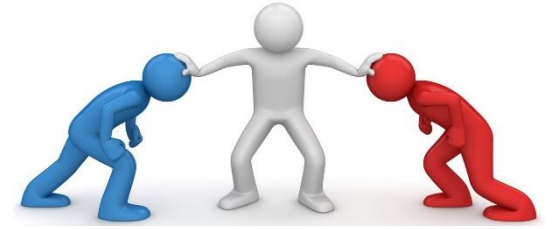
To block or not to block: a brief digression

» Some advantages of block teaching

- » Increased teaching time → longer cooperative learning activities
- » Less information and assignments → more manageable workload and less stress
- » No/fewer class changes → less time wasted between classes

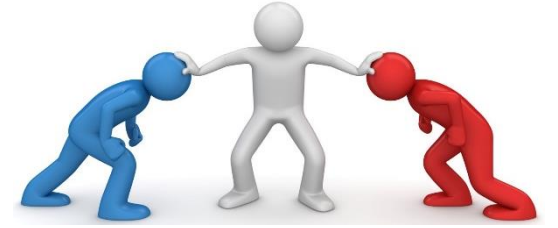
» Some disadvantages of block teaching

- » A missed day → lots of missed material → difficult to catch up
- » Difficult to maintain continuity → disconnected/unlinked material across courses
- » Attention decreases during later classes → instructors tempted to eliminate or water down contents



To block or not to block: brief overview

- » Focus on teaching delivery method and students'
 - » Assessment performance
 - » Learning experience
- » 2 cohorts of students:
 - » MSc Petroleum Engineering at the Institute of Geo-Energy Engineering at Heriot-Watt University
 - » Studying at Edinburgh campus
- » 3 teaching delivery methods
 - » Conventional: a few hours (max 1 full day) of teaching per course per week; teaching throughout whole semester
 - » Block: continuous teaching of a course for 1 to 2 weeks; teaching ends, and the final exam at the end of semester
 - » Mixed: smaller blocks spread throughout the semester with study time in between; teaching 3-4 weeks



To block or not to block: methods

- » Mixed methodology
 - » Quantitative information: statistical analysis of assessment results
 - » Qualitative information: questionnaire and focus group to capture students' learning experience

- » Quantitative analysis
 - » Natural experiment: a change in the delivery of some courses
 - » Four courses: Formation Evaluation (FE), Reservoir Engineering (RE), Drilling Engineering (DE), Petroleum Economics (PE)
 - » Students' performance based on final course marks

- » Qualitative analysis
 - » Questionnaire: analysis of student responses + selection for focus group to cover a diverse group
 - » Focus group: thematic analysis of discussion

Quantitative analysis

» Four courses

Course	2015-16	2016-17	Group
Reservoir Engineering	Block	Conventional	Treatment 1
Drilling Engineering	Block	Mixed	Treatment 2
Formation Evaluation	Block	Block	Control 1
Petroleum Economics	Block	Block	Control 2

» Difference-in-differences approach

- » Final marks from 4 modules across two academic years ($n = 789$)
- » Natural experiment: RE and DE changed delivery method

Quantitative analysis

» Four courses

Course	2015-16	2016-17	Group
Reservoir Engineering	71.20	63.08	Treatment 1
Drilling Engineering	64.81	65.65	Treatment 2
Formation Evaluation	64.20	59.90	Control 1
Petroleum Economics	69.38	56.90	Control 2

» Difference-in-differences approach

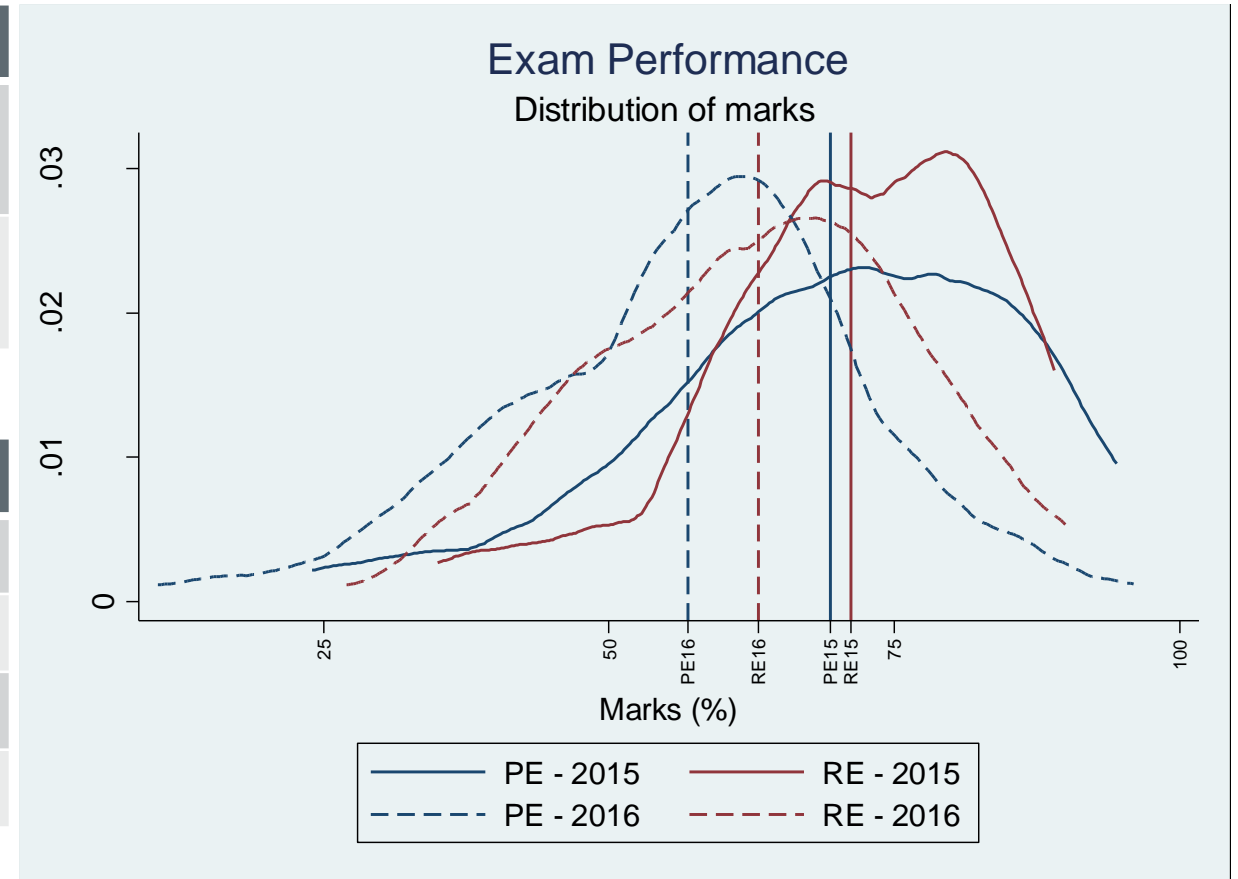
- » Most course averages have gone down (notable exception of DE)
- » Cohort effects

Quantitative analysis: control versus treatment

» Pairwise comparison of PE & RE

Course	2015-16	2016-17
Reservoir Engineering	Block 71.20	Conventional 63.08
Petroleum Economics	Block 69.38	Block 56.90

DiD	RE	PE	Difference
2015-16	71.20	69.38	-1.82
2016-17	63.08	56.90	-6.18
Change	-8.13	-12.48	4.36
			[-1.93, 10.64]

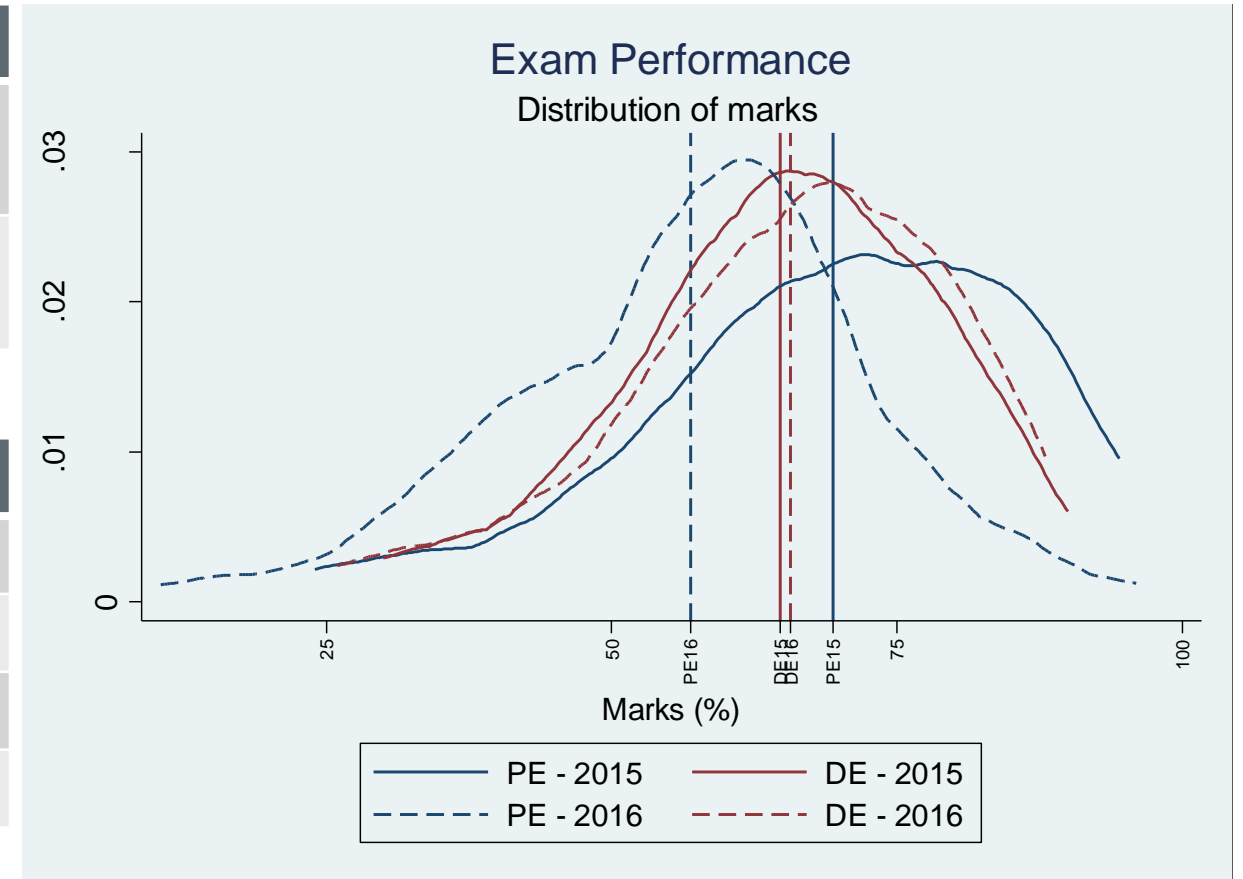


Quantitative analysis: control versus treatment

» Pairwise comparison of PE & DE

Course	2015-16	2016-17
Drilling Engineering	Block 64.81	Mixed 65.65
Petroleum Economics	Block 69.38	Block 56.90

DiD	DE	PE	Difference
2015-16	64.81	69.38	4.58
2016-17	65.65	56.90	-8.75
Change	0.84	-12.48	13.33
			[6.90, 19.75]



Qualitative analysis: questionnaire results

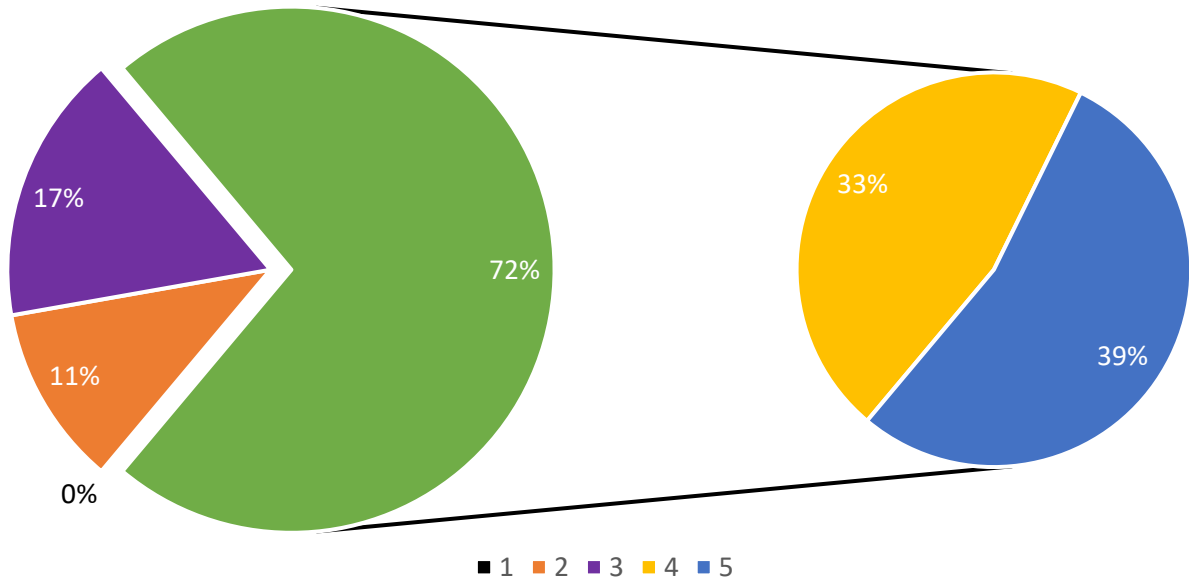
- » Questionnaire
 - » 13 questions
 - » Responses from 32 students in 2016-17 cohort
- » 69% of respondents liked block teaching and thought it was effective
- » Industry experience?
 - » With industry experience, 72% said they liked block teaching
 - » Without industry experience, 64% said they liked block teaching

Qualitative analysis: questionnaire results

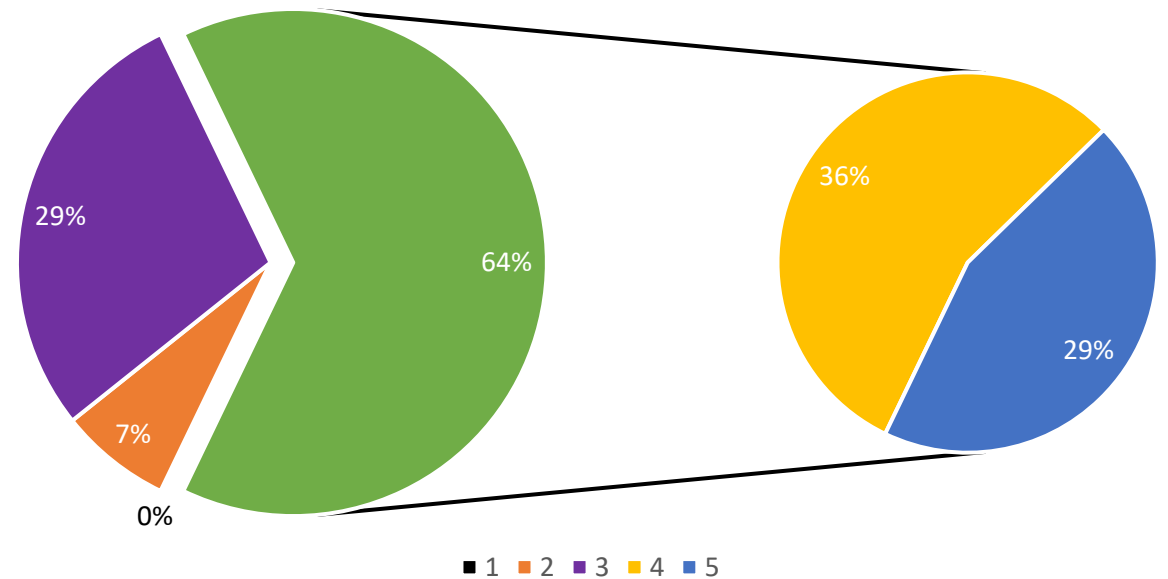
» Industry experience?

- » With industry experience, 72% said they liked block teaching
- » Without industry experience, 64% said they liked block teaching

Question 4: In general, did you like or dislike block teaching?
Responses from participants with industry experience



Question 4: In general, did you like or dislike block teaching?
Responses from participants without industry experience



Qualitative analysis: focus group

- » Focus group
 - » 5 participants
 - » Approximately 30 minutes

Student No	Industry Experience (years)	Like/Dislike Block Teaching (Likert score)	Reason for Selection
1	0	4	+ block teaching, no industry experience
2	5+	5	+ block teaching, industry experience
3	0	2	- block teaching, no industry experience
4	5+	2	- block teaching, industry experience
5	4	3	Neutral, industry experience

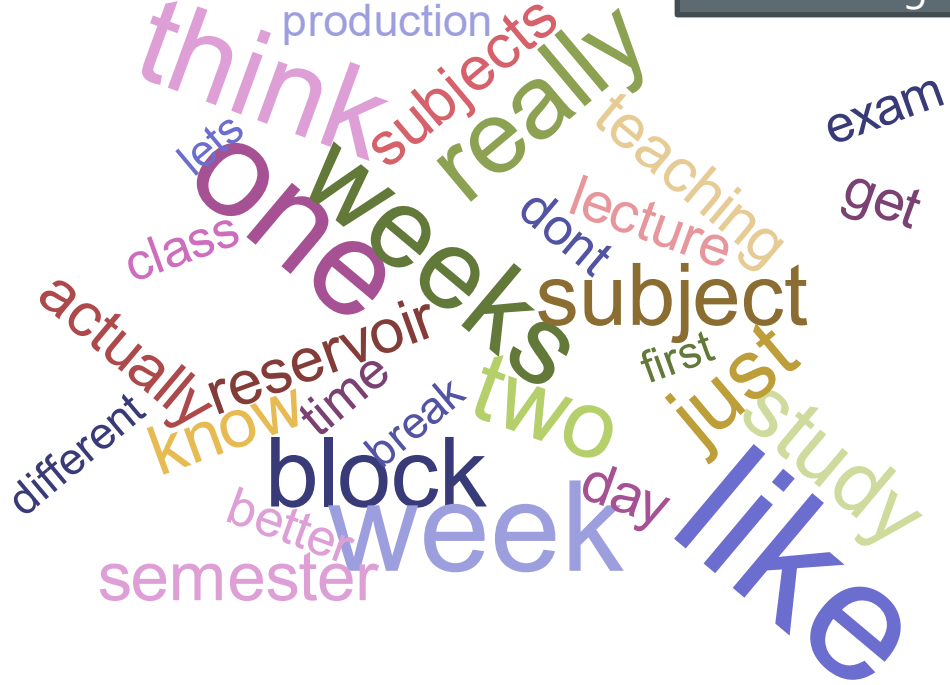
Qualitative analysis: focus group transcription

» Repeated words and phrases

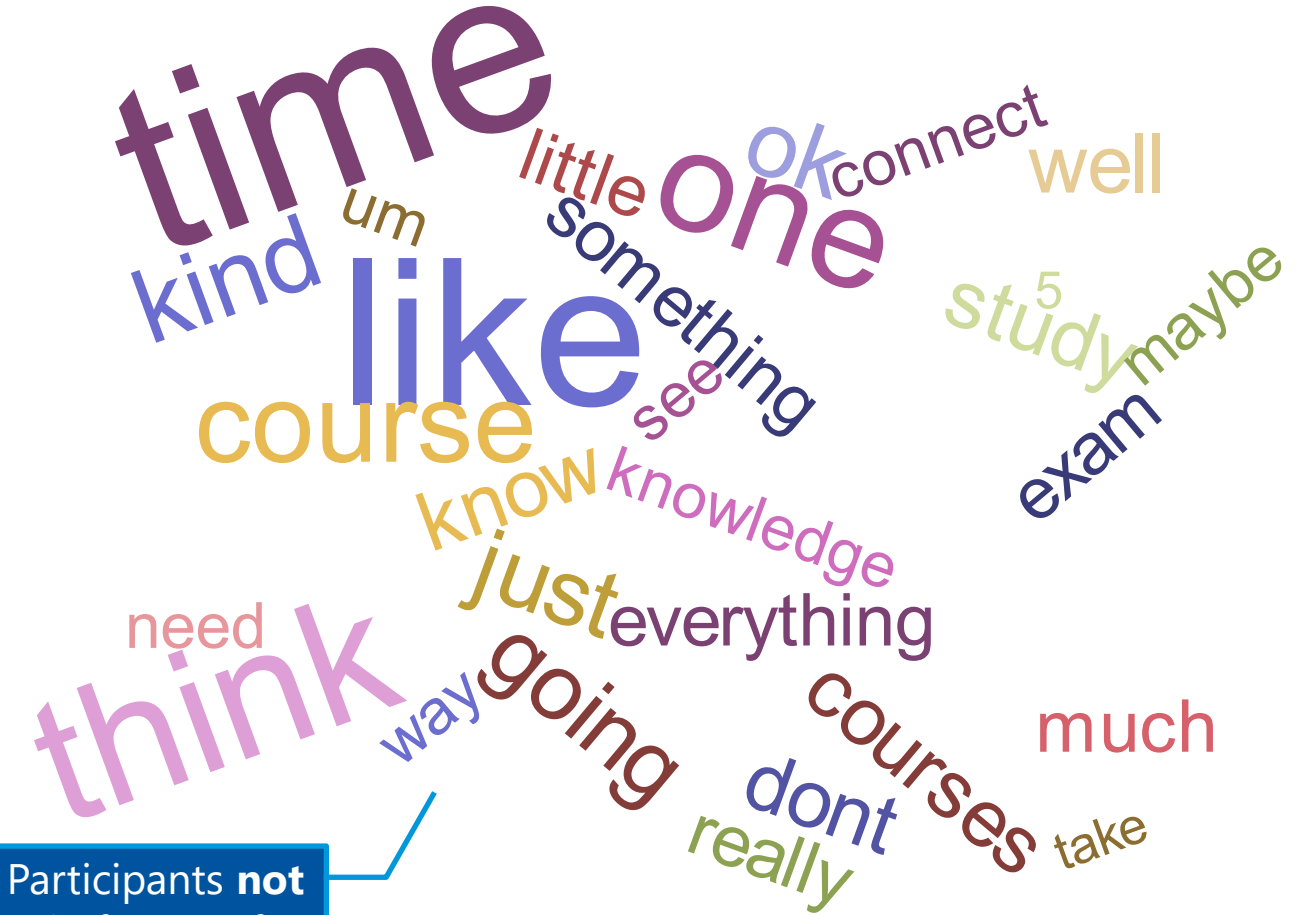
Student 1 & 2 (liked block teaching)	Student 3 & 4 (disliked block teaching)
straightaway the exam [immediately after each block]	balance them [subjects] and have enough time to connect to the materials
cannot relate at all what happened two weeks ago	a little at a time
simply concentrate on one (subject)	cannot connect all that knowledge (repeated twice)
[my] memory is not that good	don't have enough time to study or to have previous knowledge to solve it
I don't really worry about the rest	spend time with the material
cannot remember what I've studied in my first week	we can connect and we can keep all the knowledge
don't have to concentrate on the other subject	you are able to connect

Closing remarks

Participants in favour of block teaching



Participants **not** in favour of block teaching



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