Lessons learned from 200K students and 2 GB of learning gains data

Birmingham, Learning Gains conference 12 March 2019

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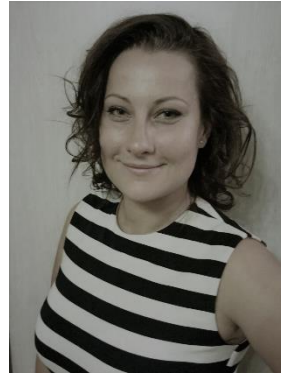
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Agenda for today

1. What have we learned from systematic literature review of 52 studies focussed on ABC learning gains (n = 42000+ students)?

2. What have we learned from 200K students and 2 GB of learning gains data in terms of ABC learning gains?

2. What have we learned from 200K students and 2 GB of learning gains data in terms of ABC learning gains?

- Affective: 1 cycle of data from OU, 1 cycle from OB
- Behavioural: 1 cycle of data from OU, 1 cycle from US
- Cognitive: 2 cycles of data from OU, 1 cycle from US and OB
- Communication with OFS with types of data collected

	OU	OB	US
data	Grades and demographics data	Grades and demographics data	Grades and demographics data
File size	1.45GB	5,59 MB	213 MB +26.78 MB
Number of students	166,722	2,653 (21 – 241 per department)	25,825 (171 – 4276)
Number of qualifications/departments	246	18	21

Affective learning gains

- Using student satisfaction data for proxies for affective learning gains was not an appropriate approach.

- First, there was a lack of consistent data over time for sufficiently large numbers of students.

- Second, substantial variation in student satisfaction rates across modules, so changes in measured affective learning gains are more likely to arise from differences in sequences of modules

- Third, those who completed the student satisfaction surveys were not representative for the wider student population.

- Fourth, when comparing the approaches across the institutions, the lack of standardisation of student satisfaction approaches, constructs, and items made it impossible to compare potential differences in learning gains across institutions over time.
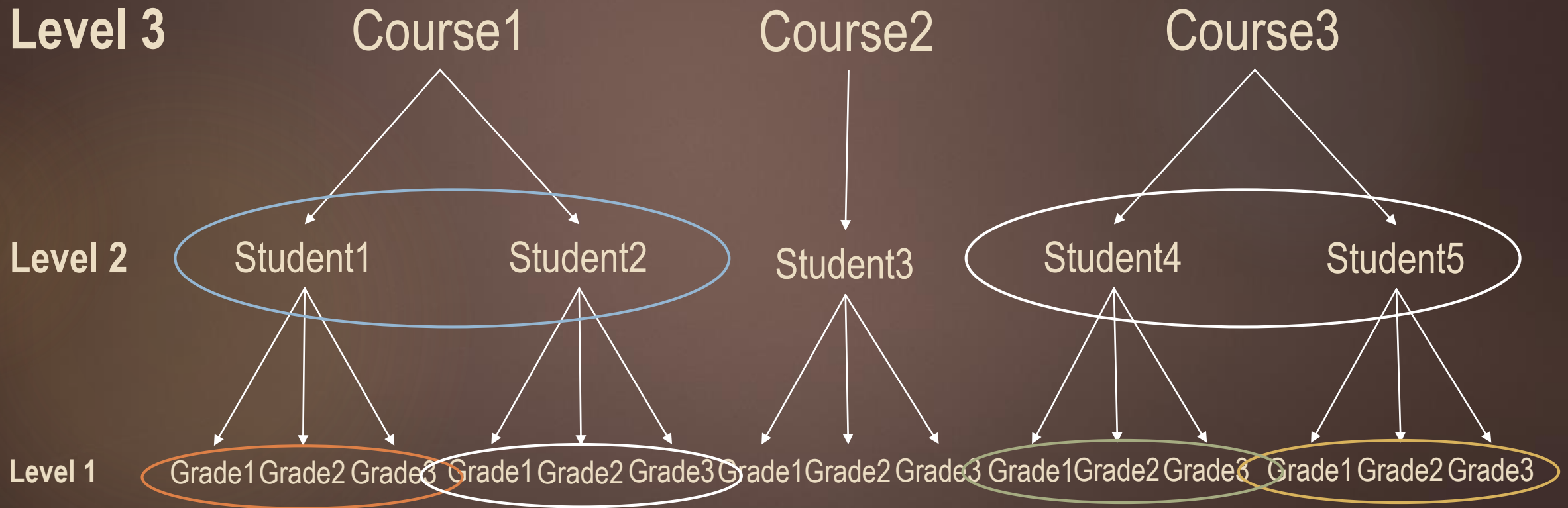
Behavioural learning gains

- Engagement data from VLE not good proxy for behaviour learning gains

- First of all, engagement of students in a respective module is strongly dependent by the learning design.

- Second, even if proxies for engagement could be identified, our research showed that the types of engagement will heavily be influenced by the type of learning design

- Third, related research looking at fine-grained analyses of what students are actually studying, and when, showed substantial variation in engagement and successful learning approaches

- In other words, our longitudinal analyses showed that our LMS proxies of engagement were not effective for understanding how students made behavioural learning gains over time.

Using Grades as proxies for cognitive learning gains

David Boud[44]:

○ "The most problematic feature of current marking practice is that it is not possible to associate any reported mark with what a student can or cannot do. The meaning of the mark is not described in terms of the standards to be reached as articulated in the stated learning outcomes. Outside its immediate context, it is not clear what meaning should be attached to a mark. Marks act as obscuring devices".

# Estimating learning trajectories

Level 3 Course1 Course2 Course3

Level 2 Student1 Student2 Student3 Student4 Student5

Level 1 Grade1 Grade2 Grade3 Grade1 Grade2 Grade3 Grade1 Grade2 Grade3 Grade1 Grade2 Grade3 Grade1 Grade2 Grade3

Cognitive learning gains

- Cognitive learning gains were measured in five ways:

- *1. Cognitive learning gains within modules*

- *2. Cognitive learning gains from first to second module*

- *3. Cognitive learning gains within a qualification*

- 4. Cognitive learning gains across different qualifications

- *5. Cognitive learning gains between institutions*

Rogaten, J., Rienties, B., & Whitelock, D. (2017). Assessing Learning Gains. In D. Joosten-ten Brinke & M. Laanpere (Eds.), Technology Enhanced Assessment. TEA 2016. Communications in Computer and Information Science (Vol. 653, pp. 117-130). Cham: Springer.

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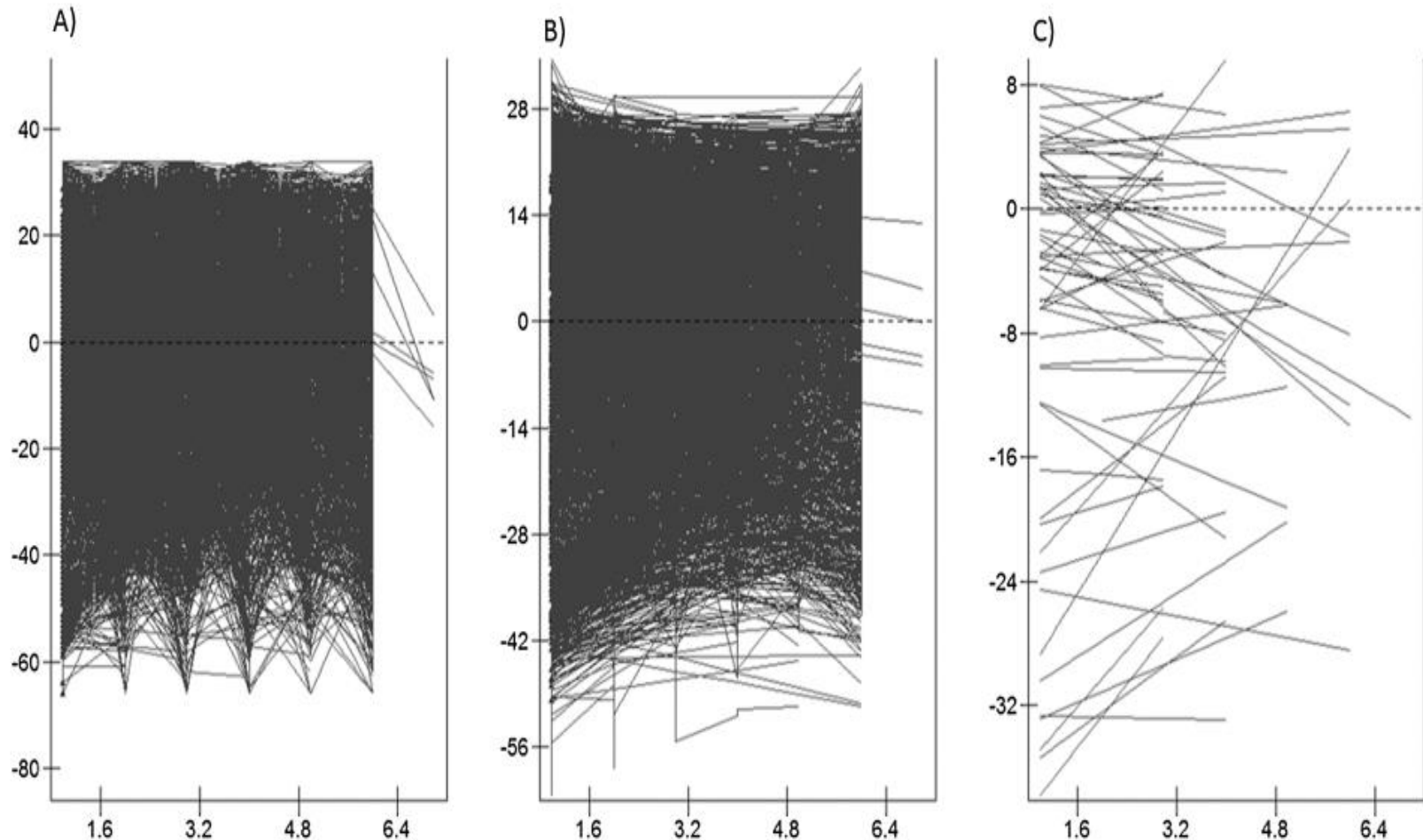
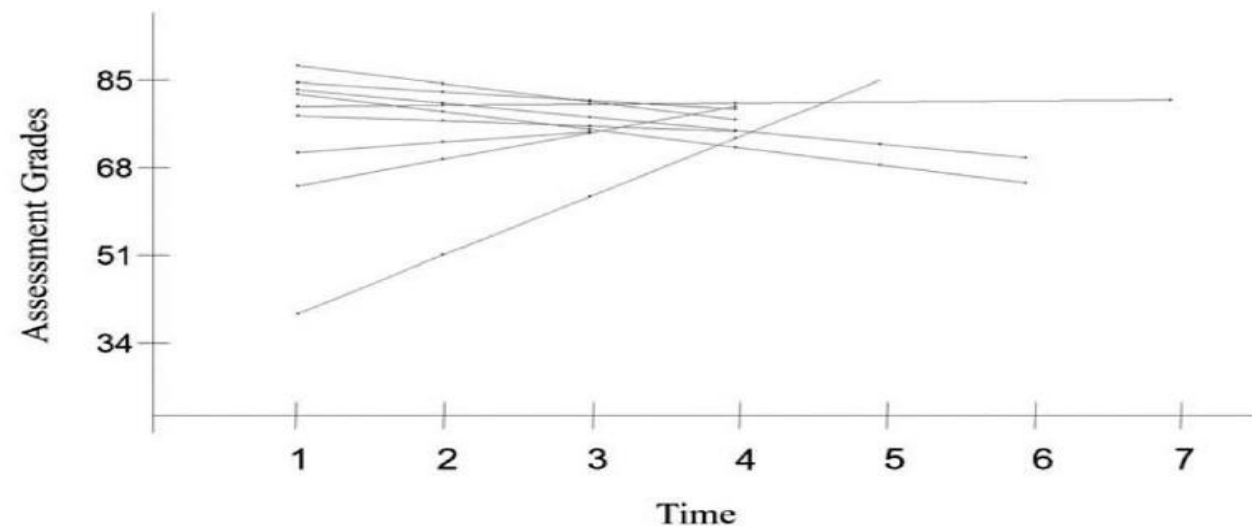- *5. Cognitive learning gains between institutions*

Module	First assessment		Final Assessment		Average continuous assessment score	
	M (Median)	SD	M (Median)	SD	M (Median)	SD
Module 1	83.3 (86)	11.0	89.5 (92)	9.3	82.3 (86)	14.3
Module 2	55.0 (47)	22.2	88.0 (91)	11.6	72.3 (72)	21.6
Module 3	77.9 (80)	12.5	84.7 (87)	9.6	74.1 (74)	18.2
Module 4	70.7 (74.5)	17.8	81.1 (83)	12.7	73.0 (73)	17.0
Module 5	77.2 (79)	12.3	84.2 (86)	9.0	76.7 (77)	13.4
Module 6	88.2 (91)	9.6	89.6 (91)	7.7	82.7 (83)	13.2
Module 7	41.1 (42)	5.5	79.3 (86)	18.7	62.2 (62)	22.0
Module 8	85.0 (87)	10.8	89.8 (90)	6.6	80.9 (81)	14.5
Module 9	81.4 (83)	9.9	86.1 (87)	8.0	76.7 (77)	13.8

Note: The TMAs are marked on a scale from 0 to 100. The minimum passing mark is 40.

Rogaten, J., & Rienties, B. (2018). Which first-year students are making most learning gains in STEM subjects? Higher Education Pedagogies, 3(1), 161-172. doi: 10.1080/23752696.2018.1484671.

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Rogaten, J., Clow, D., Edwards, C., Gaved, M., Rienties, B. (Accepted with minor revision: 12-07-2018). Do we need to re-imagine university assessment in a digital world? A big data exploration.
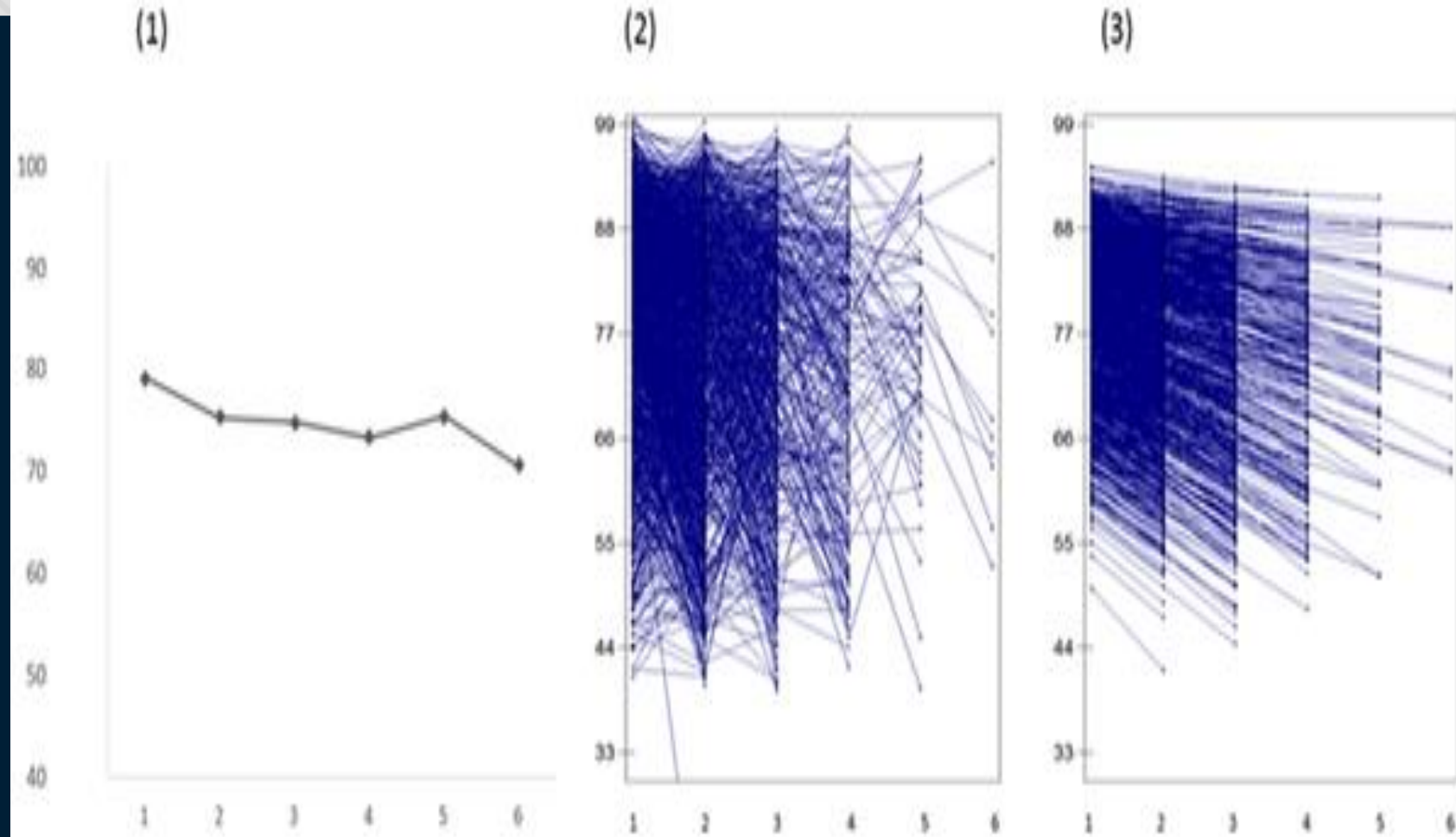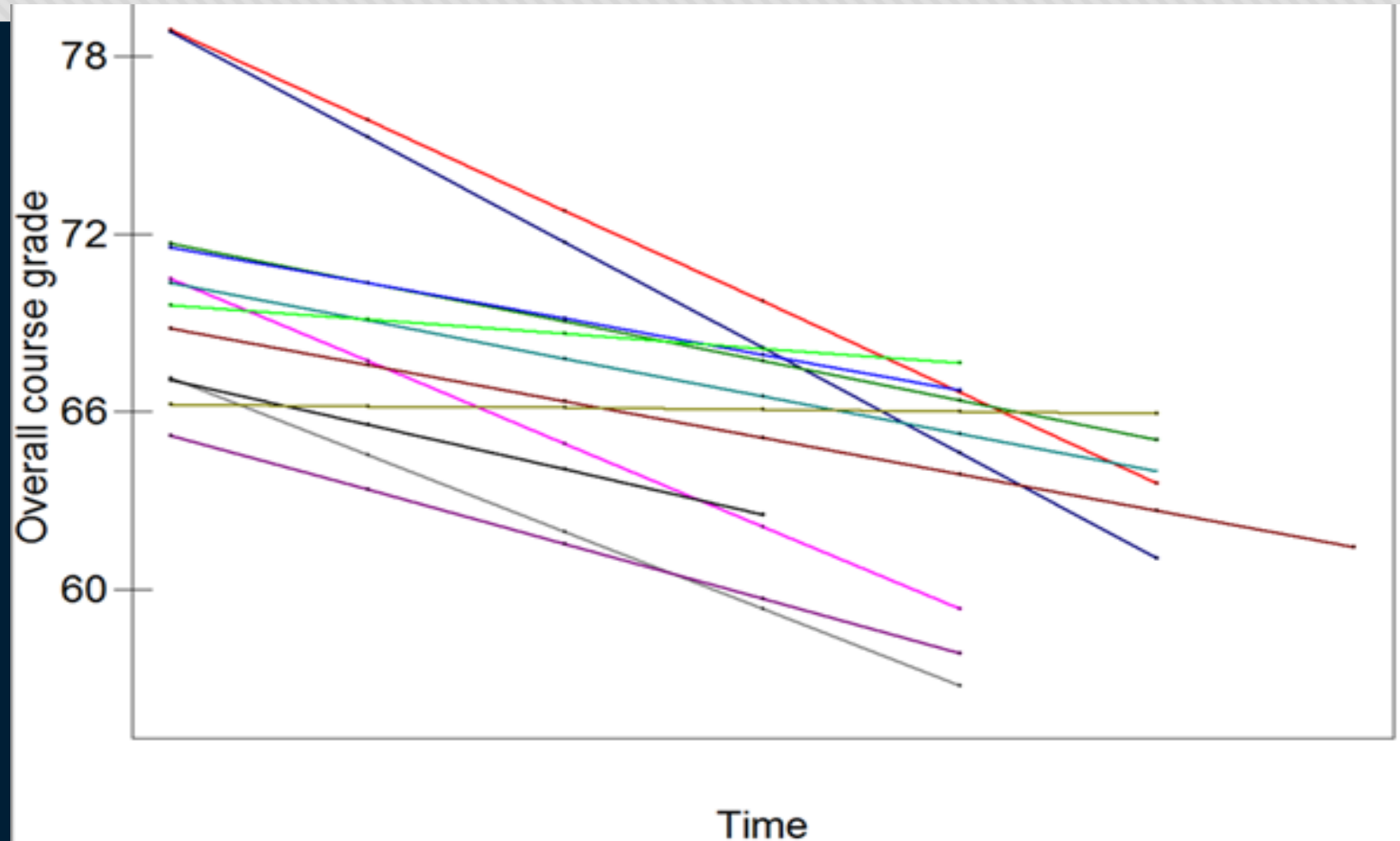
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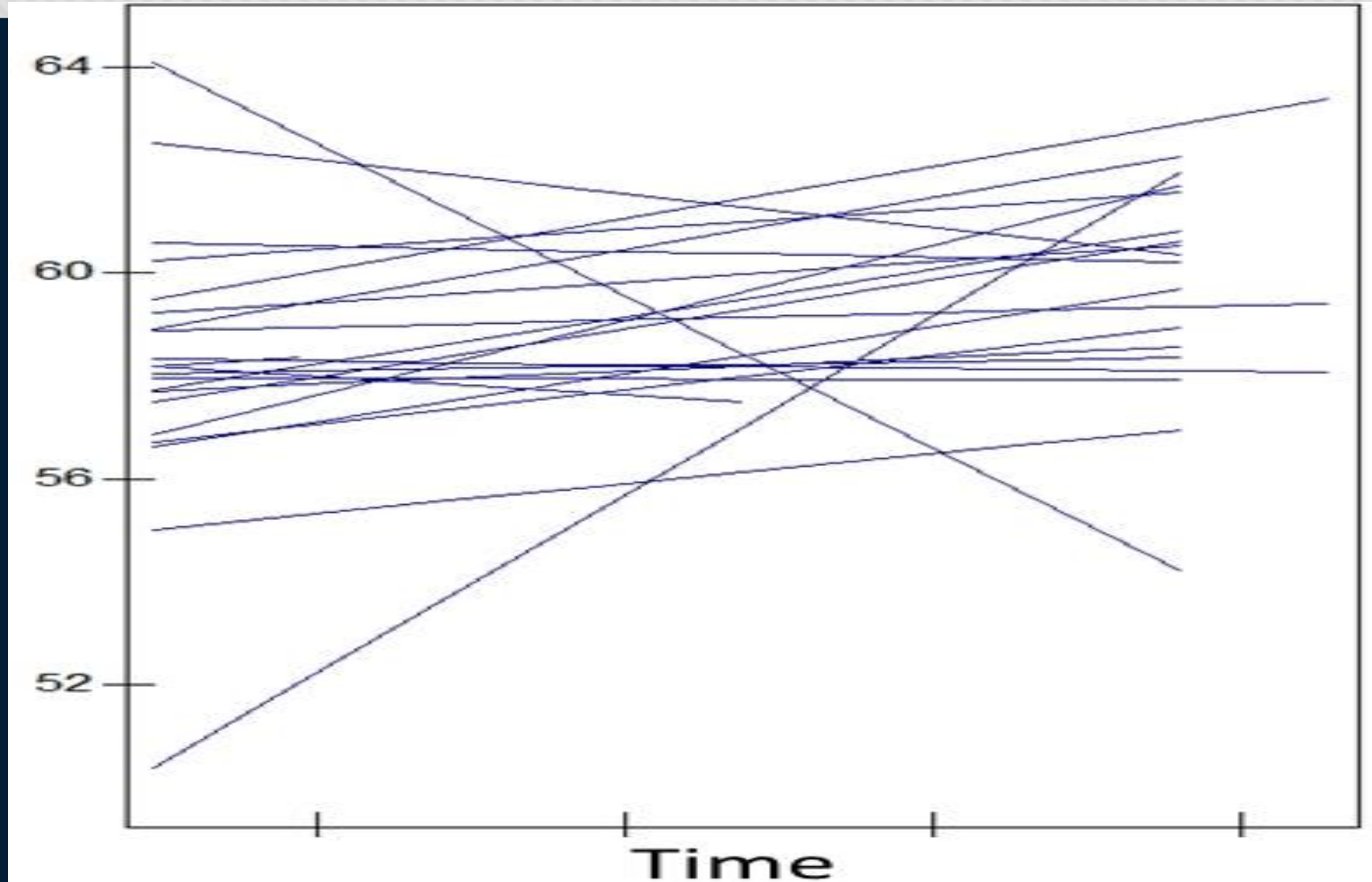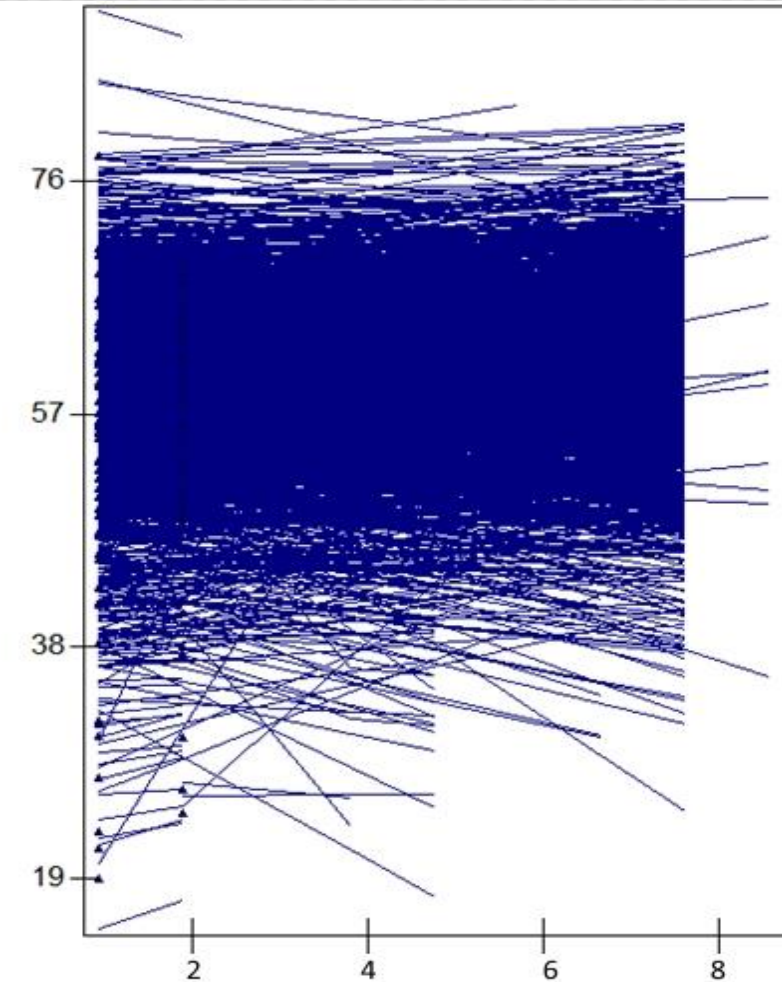
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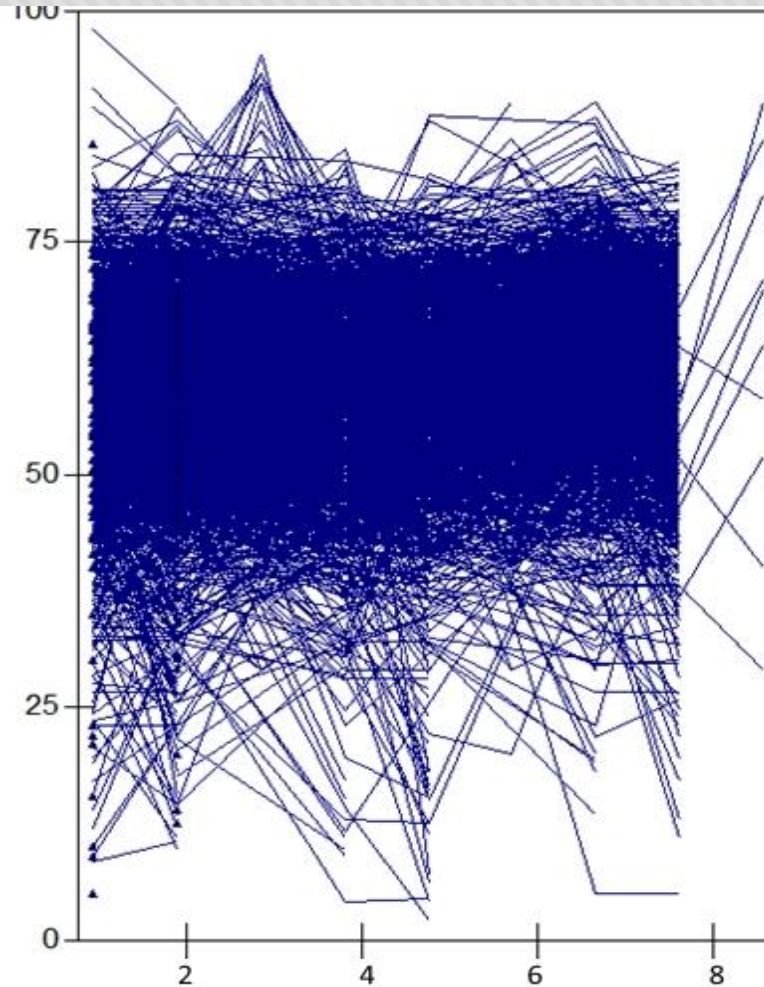
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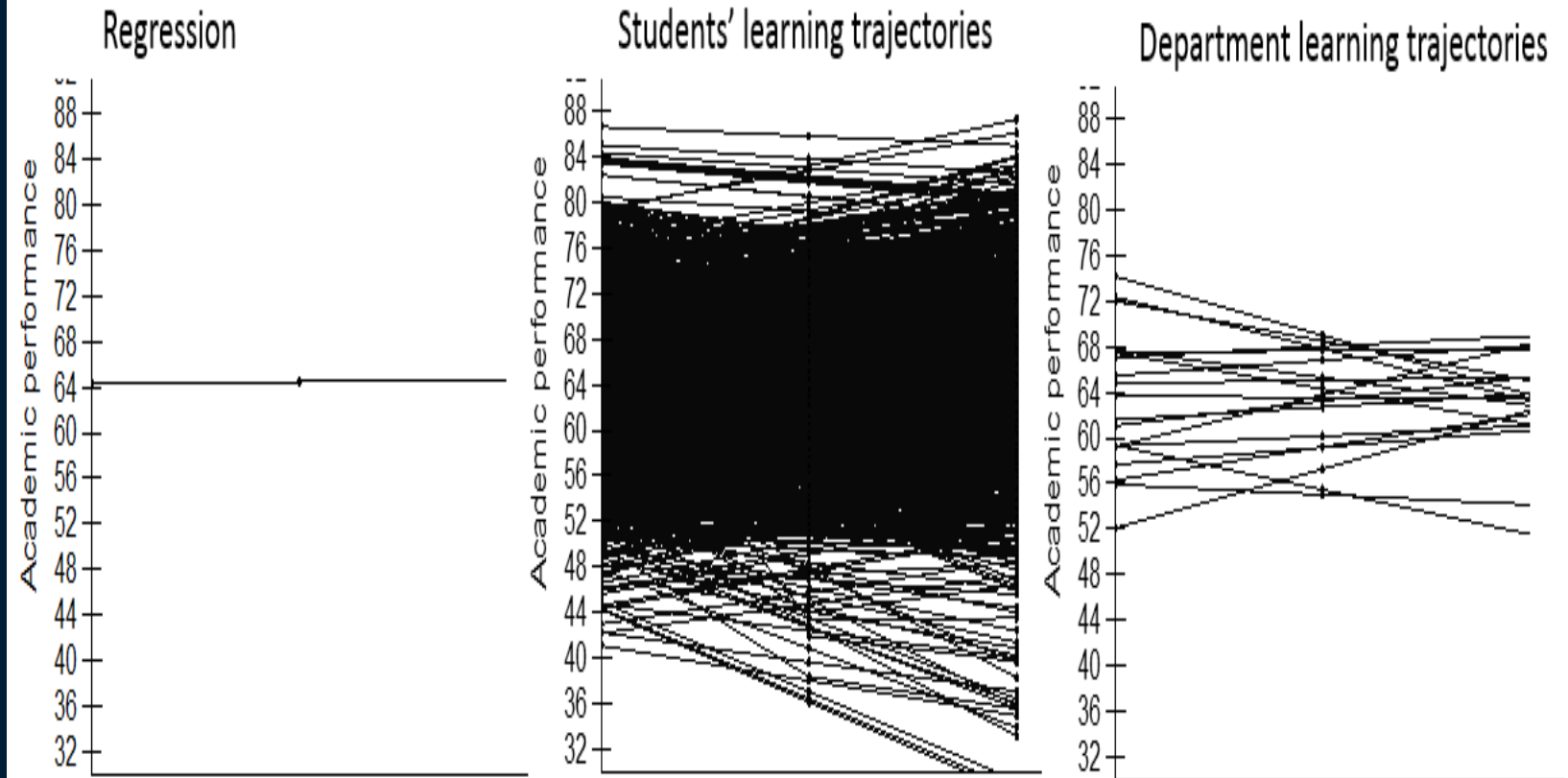- 5. Cognitive learning gains between institutions

Regression | Students' learning trajectories | Department learning trajectories

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Table 1 Proportion of variance explained by qualification, student characteristics, and across modules (OU, OB, US)

The proportion of variance due to the differences	OU	OB	US
Level 3: Between qualifications	12%	8%	22%
Level 2: Between students	45%	67%	22%*
Level 1 Between modules (i.e., within-student level between modules any one student completed)	43%	25%	56%
Number of students (n)	18329	1990	1547

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What students think they gain?

I think I am more openly critical (in the positive sense)

I observe things better, work into deeper and work on the whole picture rather than narrow.

I think more logically and more 'why did that happen, why did that happen', there is more questioning, instead of just to accept things.

now I say, 'you know what, I can do that in future'.

Day to day when I have my book I have very different approach from recording my notes for example

I am much better at time management, I am much more organised now and planning things in advance.

[in my new job], there will reports and planning to be drawn and I think that this will be an aspect of my job where I can say yes the OU study and discipline I've received from the OU has actually contributed to that.

I feel more confident and I am happier because I am doing something I have always wanted to be doing and something that interests me

I think I can go confidently to speak what I learned. But even to a job that isn't directly related to this subject area. I could talk about my experiences, my time management, team working, computer skills as I feel much more confident, I can say, 'actually I have done this'. Which was one of the reasons I wanted to a degree.

Do grades matter?

How well do your grades represent your progress?

Well there are questions with the text books, exercises. So if I get correct answer, I know I am doing fine. When I say correct answer that's not the end product that's the whole answer check through it

probably in the same way that many other people when they look at their own assignment results and exam results …. I feel that I am doing fairly well but I'd always like to improve myself to my results.

I get quite upset when I get around 70s

Even if it is 1-2 marks I say what did I do differently and I go back to tutor to see what did I do differently. What happened, what caused it?

… because I am putting so much effort I want my grades to reflect it. They usually go up. But it is Marginal. 5 marks across all the TMAs that's the variance, it just varies very slightly

"I suppose you could say… the skills you learn, like group work, presenting and being able to talk to people…
I would say the main way that you think about [achievement], it's just the grade because… that's what is going
on your CV… and affect what job you get. … I'd say the skills you learn as well as becoming an all-rounded person
are quite important as well".

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