While we are getting ready for our interactive workshop:

1. Can you indicate in the Zoom chat who you are?

2. What made you join this session on learning gains?

3. What do you hope to achieve after this interactive workshop?

How learning gains and Quality Assurance are (mis)Aligned: An Interactive Workshop

Prof Bart Rienties, Head of Academic Professional Development, Open University UK

Dr Jekaterina Rogaten, Teaching and Learning co-ordinator at the University of the Arts, London
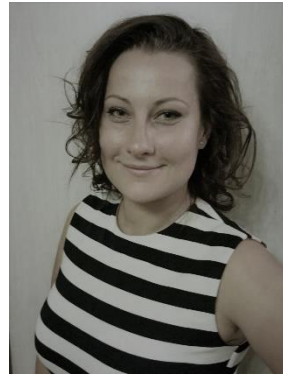
Milton Keynes/Online: 23-09-2020 Workshop 3 INQAAHE

Prof Bart Rienties
Open University

Dr Jekaterina Rogaten
University of the Arts

Prof Rhona Sharpe
University of Surrey

Prof Ian Kinchin
University of Surrey

Dr Simon Lygo-Baker
University of Surrey

Dr Simon Cross
Open University

Prof Denise Whitelock
Open University

Prof Allison Littlejohn
Open University

Dr Ian Scott
Oxford Brookes

Dr George Roberts
Oxford Brookes

While we are getting ready for our interactive workshop:

1. Can you indicate in the Zoom chat who you are? (or if you are brave turn on your mic and briefly share your thoughts)?

2. What made you join this session on learning gains?

3. What do you hope to achieve after this interactive workshop?

1500-1515 Welcome by INQAAHE President and getting to know each other

1515-1600 What is this concept of learning gains, and why might it be useful for your institution?
- Brief definition of learning gains
- Interactive discussion in two breakout rooms
- Reporting of the findings/discussions from the two breakout rooms, and our own reflections

1600-1700 How could learning gains be used for quality assurance?
- Brief definition of learning gains and quality assurance
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- Best practice
- What have we learned from ABC learning gains project

Figure 1: Representation of learning gain
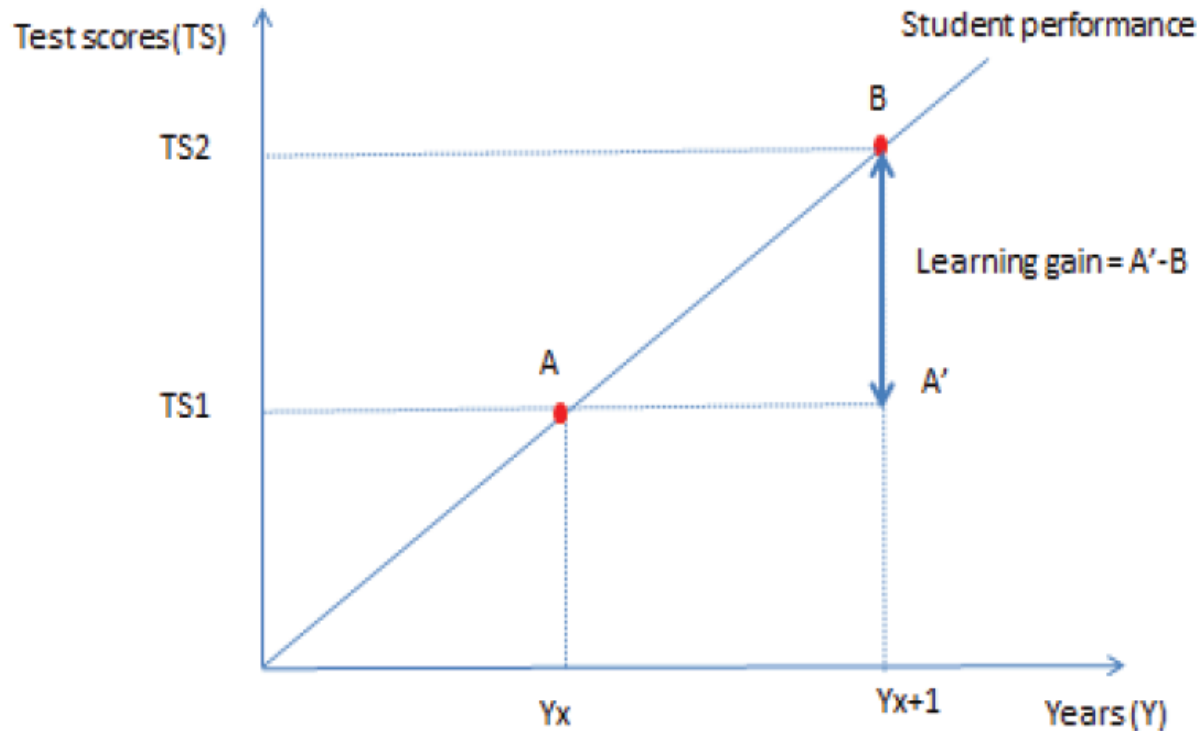
As indicated in the RAND report by McGrath et al. (2015, xi), learning gains are defined as:

"as the 'distance travelled', or the difference between the skills, competencies, content knowledge and personal development demonstrated by students at two points in time. This allows for a comparison of academic abilities and how participation in higher education has contributed to such intellectual development."

Source: Author's own

McGrath, C. H., Guerin, B., Harte, E., Frearson, M., & Manville, C. (2015). Learning gain in higher education. www.rand.org/t/rr996/

1500-1515 Welcome by INQAAHE President and getting to know each other

1515-1600 What is this concept of learning gains, and why might it be useful for your institution?

- Brief definition of learning gains
- What types of learning gains would be useful?
- Is your institution currently using concepts like learning gain?
- Why might learning gains be useful for your institution? Why not?

1500-1515 Welcome by INQAAHE President and getting to know each other

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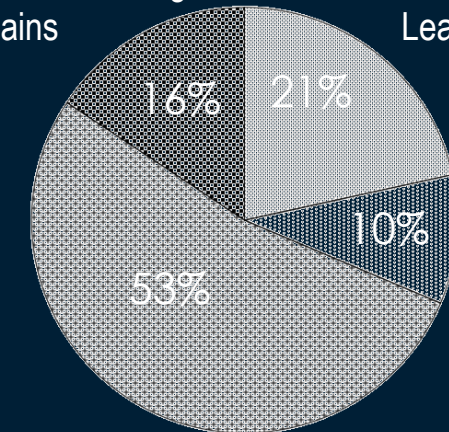# How are learning gains measured: a systematic analysis

- 52 studies selected: 42000+ students

- The concept of learning gain is primarily used to examine the effect of any particular educational 'intervention'

- There is a gradual increase in studies examining learning gains all across the world

- All learning gains can be classified into ABC

Number of studies (y-axis) vs *Year* (x-axis) bar chart
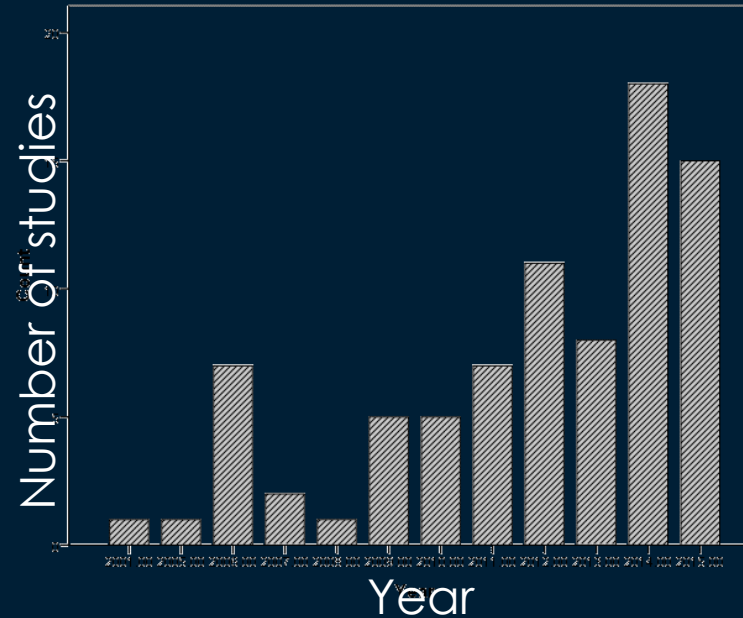
Affective-Behaviour-Cognitive Learning Gains — 16%

Affective-Cognitive Learning Gains — 21%

Behaviour-Cognitive Learning Gains — 10%

Cognitive Learning Gains — 53%

Rogaten, J., Rienties, B, Sharpe, R., Cross, S., Whitelock, D., Lygo-Baker, S., Littlejohn, A. (2018). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment and Evaluation in Higher Education*, *44*(3), 321-337.

What type of learning gains are there

Affective learning gains:
- Attitude
- Confidence
- Enjoyment
- Enthusiasm for a topic
- Feeling comfortable with complex ideas
- Interest in a topic
- Motivation
- Satisfaction
- Self-efficacy

Behavioural learning gains:
- Ability to work independently
- Applied conceptual understanding
- Effort and engagement
- Leadership skills
- Team/group working skills
- Practical competence
- Resource management
- Responsibility
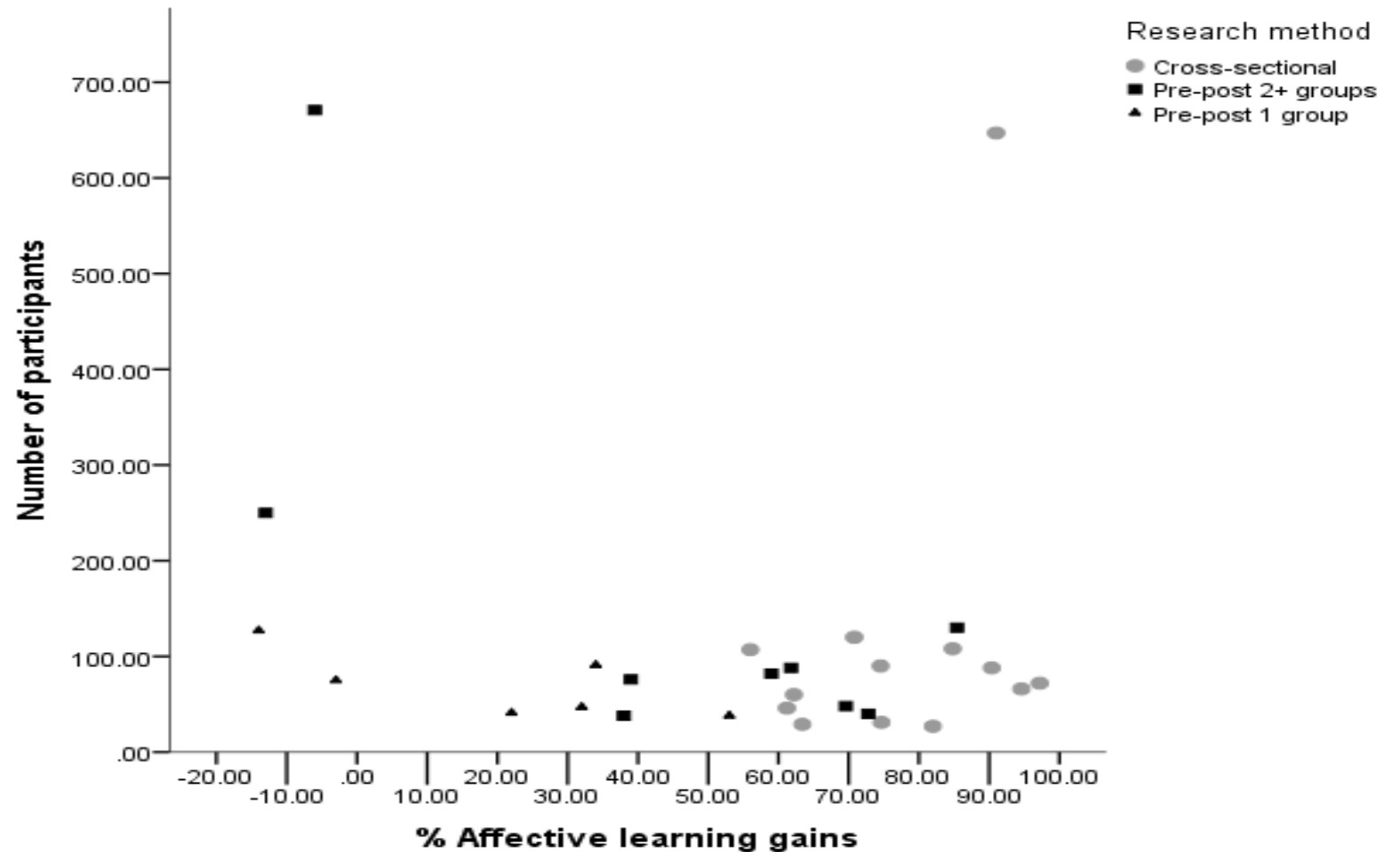- Preparation skills
- Time management skills

Cognitive learning gains:
- Students' ability to evaluate and create knowledge
- Analytical ability
- Autonomous cognition
- Critical thinking
- Ethical thinking
- Creative and higher order thinking Discipline specific skills
- Knowledge and understanding of the topic,
- Oral and written communication
- Problem solving
- Scientific reasoning
- Statistical and research kills/knowledge

Rogaten, J., Rienties, B, Sharpe, R., Cross, S., Whitelock, D., Lygo-Baker, S., Littlejohn, A. (2018). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment and Evaluation in Higher Education*, *44*(3), 321-337.
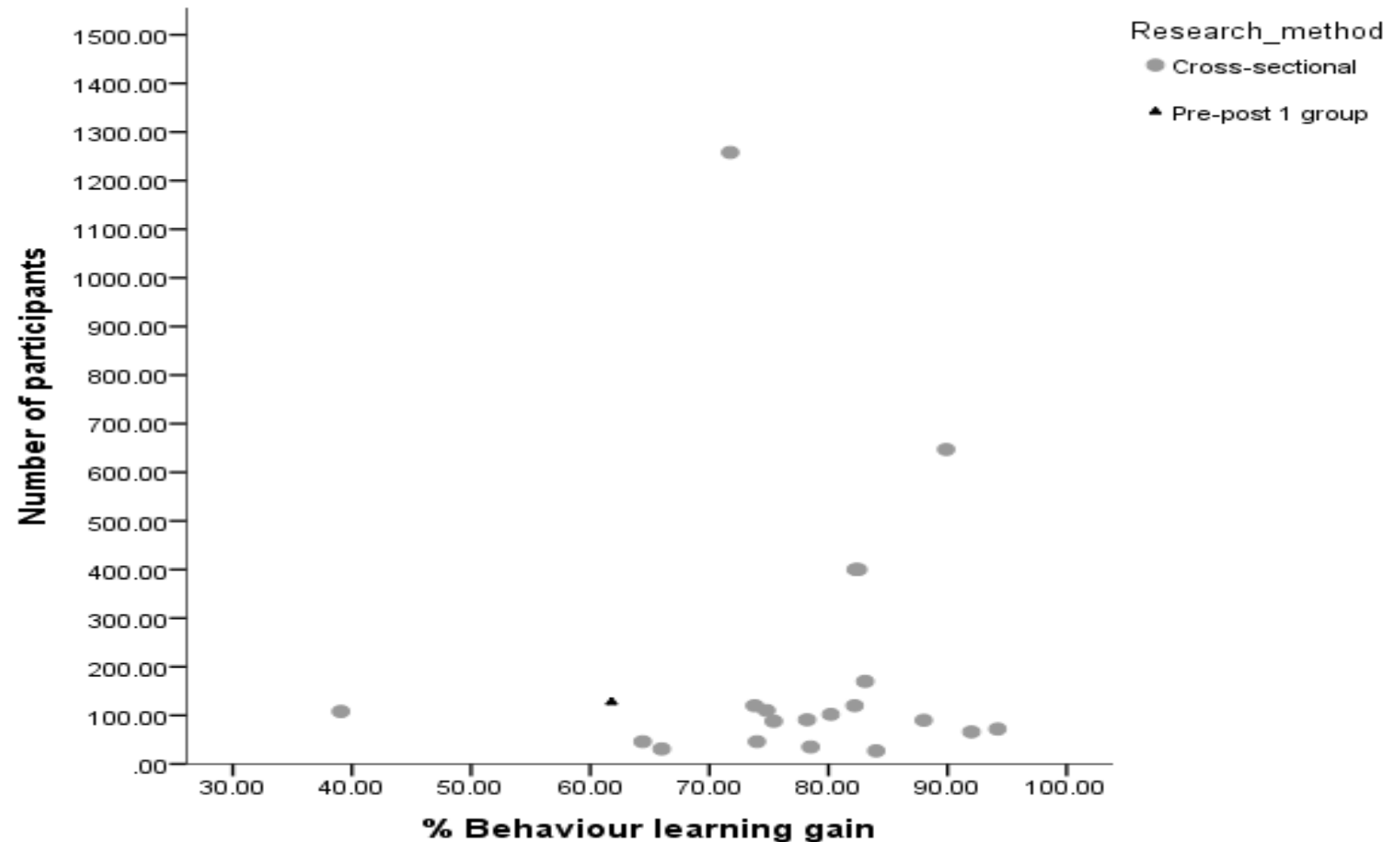
Affective learning gains

- Affective learning gains were measured in 19 studies (e.g., Moorer, 2009; Strayhorn, 2010) comprising 28 student samples totalling 3,333 higher education students.

- Self-reported affective learning gains there were mainly studies that reported relatively high learning gains of > 40%, ranging from 39-98%

Rogaten, J., Rienties, B, Sharpe, R., Cross, S., Whitelock, D., Lygo-Baker, S., Littlejohn, A. (2018). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment and Evaluation in Higher Education*, 44(3), 321-337.
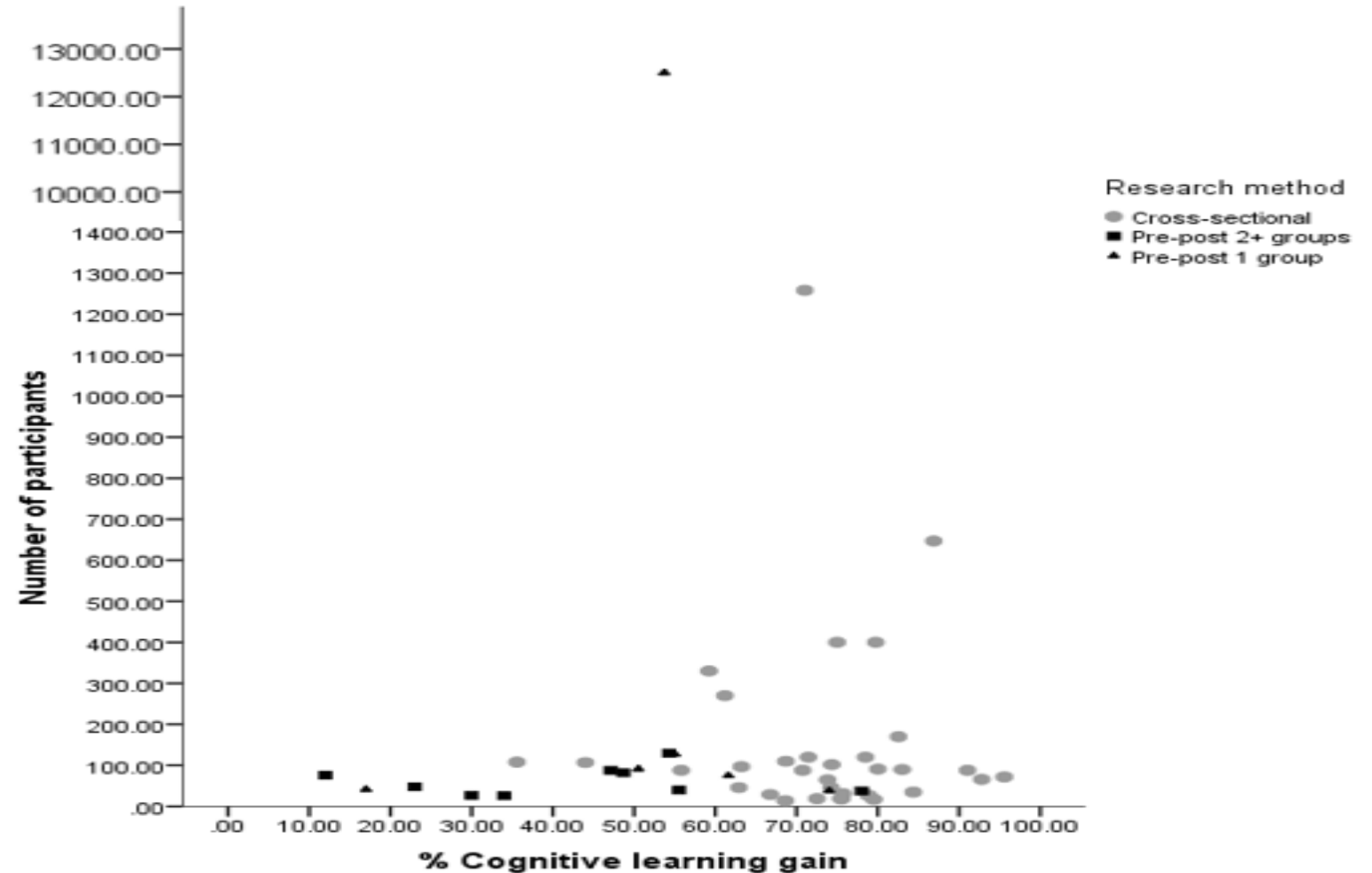
Behavioural learning gains

- Behavioural learning gains were measured in 13 studies (e.g., Casem, 2006; Varsavsky et al., 2014) comprising 23 student samples totalling 4,268 higher education students.

- With the exception of one study (Stolk and Martello 2015), the remaining 12 studies used a cross-sectional design for measuring behavioural learning gains

Rogaten, J., Rienties, B, Sharpe, R., Cross, S., Whitelock, D., Lygo-Baker, S., Littlejohn, A. (2018). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment and Evaluation in Higher Education, 44*(3), 321-337.

Cognitive learning gains

- Cognitive learning gains were measured in 22 studies, comprising 39 student samples, totalling 18,024 higher education students.

- Pre-post testing was used in four studies, and two studies used a form of pre-post testing through reflection all totalling to seven student samples.

- Only in one sample (Stolk and Martello 2015) did students report lower cognitive ability at the post-test than at the pre-test, but the difference was not significant.

Rogaten, J., Rienties, B, Sharpe, R., Cross, S., Whitelock, D., Lygo-Baker, S., Littlejohn, A. (2018). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment and Evaluation in Higher Education, 44*(3), 321-337.
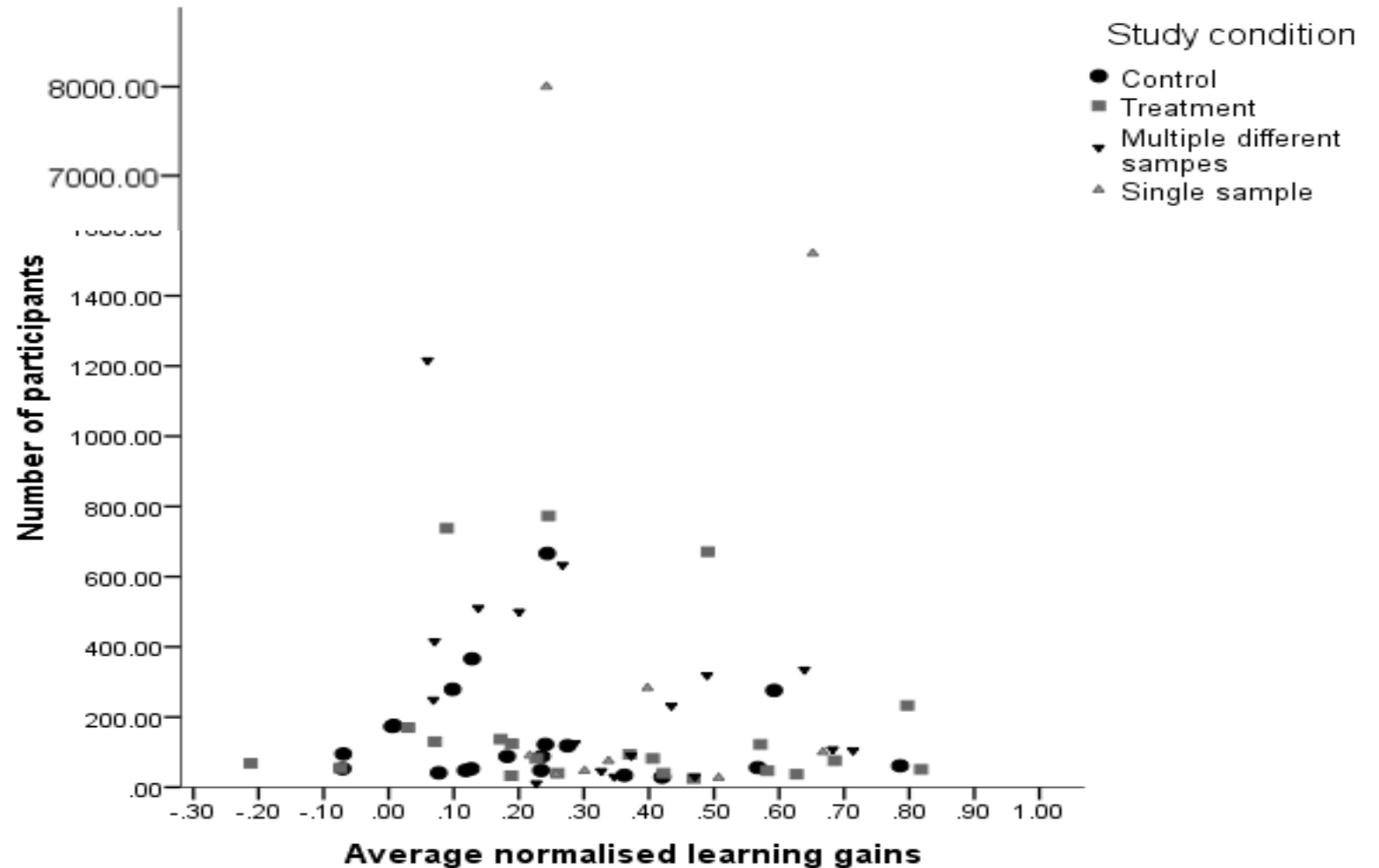
Cognitive learning gains

- Follow-up analyses of treatment studies which compared a change in curricular or module design (treatment) enhanced students learning in comparison to traditional lectures (control) found that students performed better in the treatment condition <g> = 0.39 than in control condition <g> = 0.26.

- Again a wide range of learning gains were found, whereby average normalised learning gains g ranged from -.20 to .81,

Rogaten, J., Rienties, B, Sharpe, R., Cross, S., Whitelock, D., Lygo-Baker, S., Littlejohn, A. (2018). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment and Evaluation in Higher Education, 44(3), 321-337.*

Learning gains concepts widely used but have different meanings in different contexts

- Following a robust and thorough coding and analysis of affective, behavioural, and cognitive learning gains across 52 empirical learning gain studies, our systematic review found that most studies focussed on cognitive learning gains, mostly using pre-post objective testing.

- Studies examining a combination of affective, behavioural, and cognitive learning gains, but in their majority they employed cross-sectional design, and mostly relied on self-reported retrospective estimates of learning gains, with obvious potential limitations

- 52 studies reported a vast range of learning gains, highlighting on the one hand the inherent and well-recognised complexity of higher education teaching practice, and on the other hand the methodological complexities of defining what actually constitutes a learning gain, and how this could potentially be measured appropriately.

- The reported magnitude of learning gains amongst these 52 studies was surprisingly diverse and wide ranging.

- There is a lack of consistency in the ways in which learning gains are currently measured and reported. These inconsistencies and limitations hamper effective comparisons of learning gains and teaching excellence.

- As highlighted by Everson (2016) we need to make it clear to teachers and students what we mean when measuring value added.

- We recommend a greater emphasis on longitudinal measurement of learning gains using validated approaches.

Rogaten, J., Rienties, B, Sharpe, R., Cross, S., Whitelock, D., Lygo-Baker, S., Littlejohn, A. (2018). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment and Evaluation in Higher Education*, *44*(3), 321-337.

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1600-1700 How could learning gains be used for quality assurance?

- Brief definition of learning gains and quality assurance
- Is your institution using learning gains at present for quality assurance
- <mark>Take a short break</mark>
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1. Rogaten, Jekaterina; Clow, Doug; Edwards, Chris; Gaved, Mark and Rienties, Bart (2020). Are Assessment Practices Well Aligned Over Time? A Big Data Exploration. In: Bearman, M; Dawson, P; Ajjawi, R.; Tai, J. and Boud, D. eds. *Re-imagining University Assessment in a Digital World.* The Enabling Power of Assessment, 7. Cham: Springer, pp. 147–164.

•2. Rogaten, Jekaterina and Rienties, Bart (2020). A critical review of learning gains on its methods and approaches. In: Hughes, Christina and Tight, Malcolm eds. *International Perspectives on Higher Education Research.* Emerald, (In Press).

•3. Rogaten, Jekaterina; Rienties, Bart; Sharpe, Rhona; Cross, Simon; Whitelock, Denise; Lygo-Baker, Simon and Littlejohn, Allison (2019). Reviewing affective, behavioural, and cognitive learning gains in higher education. *Assessment & Evaluation in Higher Education*, 44(3) pp. 321–337.

•4. Rogaten, Jekaterina and Rienties, Bart (2018). Which first-year students are making most learning gains in STEM subjects? *Higher Education Pedagogies*, 3(1) pp. 161–172.

•5. Rogaten, Jekaterina; Whitelock, Denise and Rienties, Bart (2016). Assessing learning gains. In: *Technology Enhanced Assessment*, Communications in Computer and Information Science, pp. 117–132.

How learning gains and Quality Assurance are (mis)Aligned: An Interactive Workshop

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Milton Keynes/Online: 23-09-2020 Workshop 3 INQAAHE

The Open University

- 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

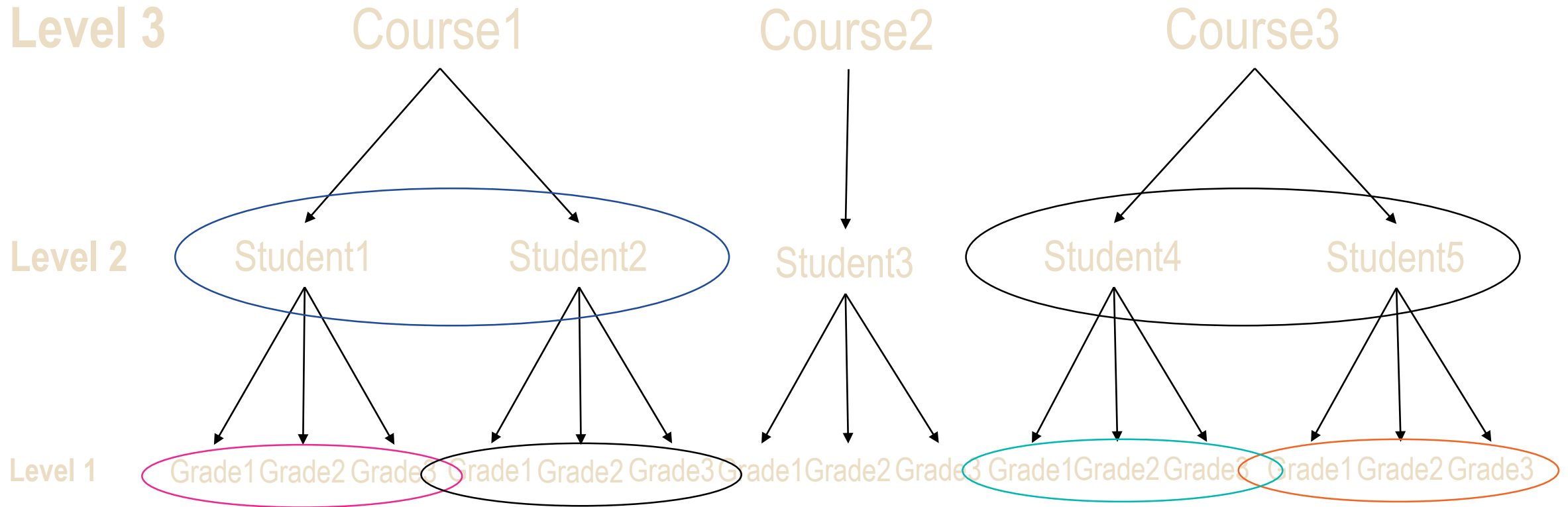|	OU	OB	US
data	Grades and demographics data	Grades and demographics data	Grades and demographics data
File size	1.45GB	5,59 MB	213 MB +26.78 MB
Number of students	166,722	2,653 (21 – 241 per department)	25,825 (171 – 4276)
Number of qualifications/departments	246	18	21

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.
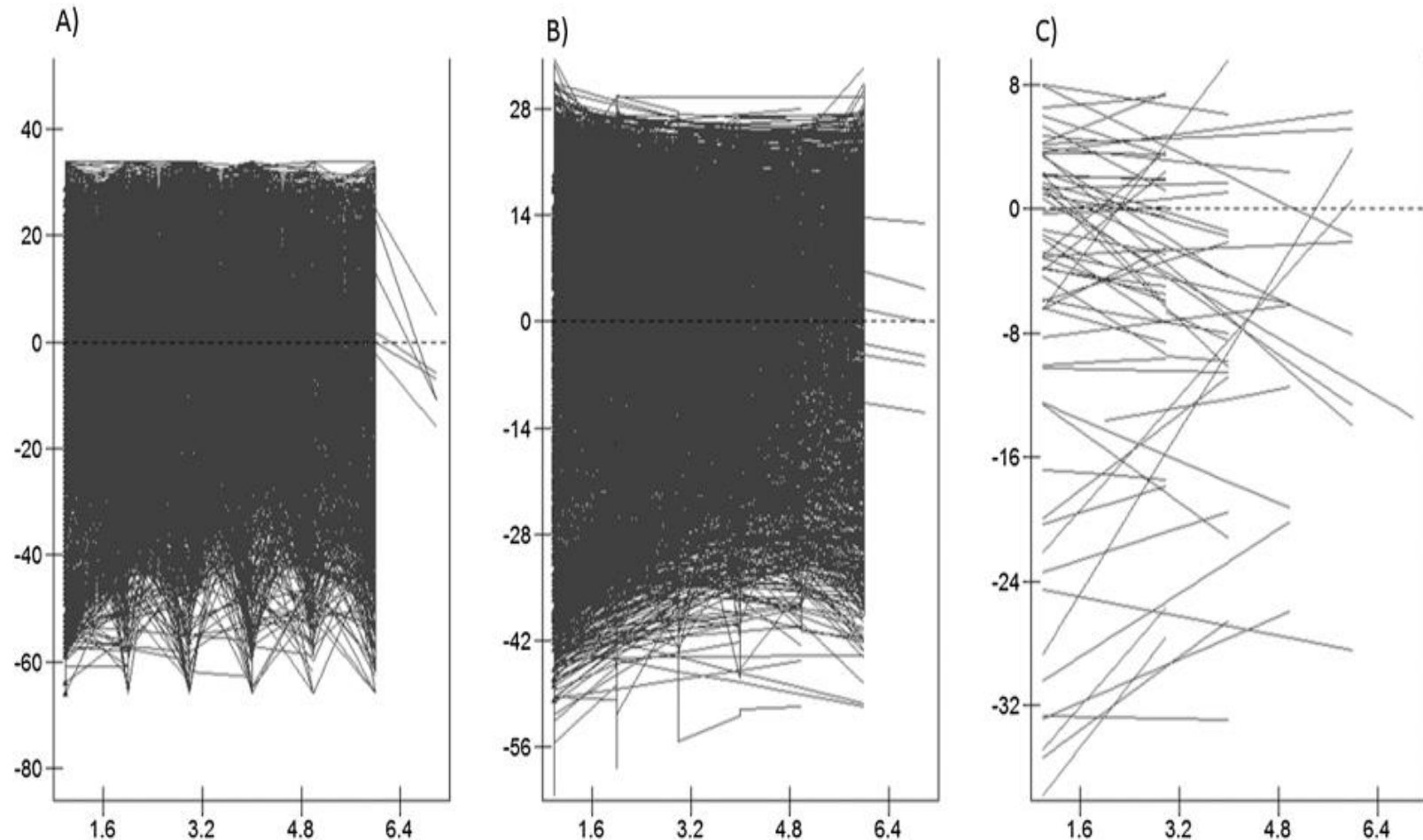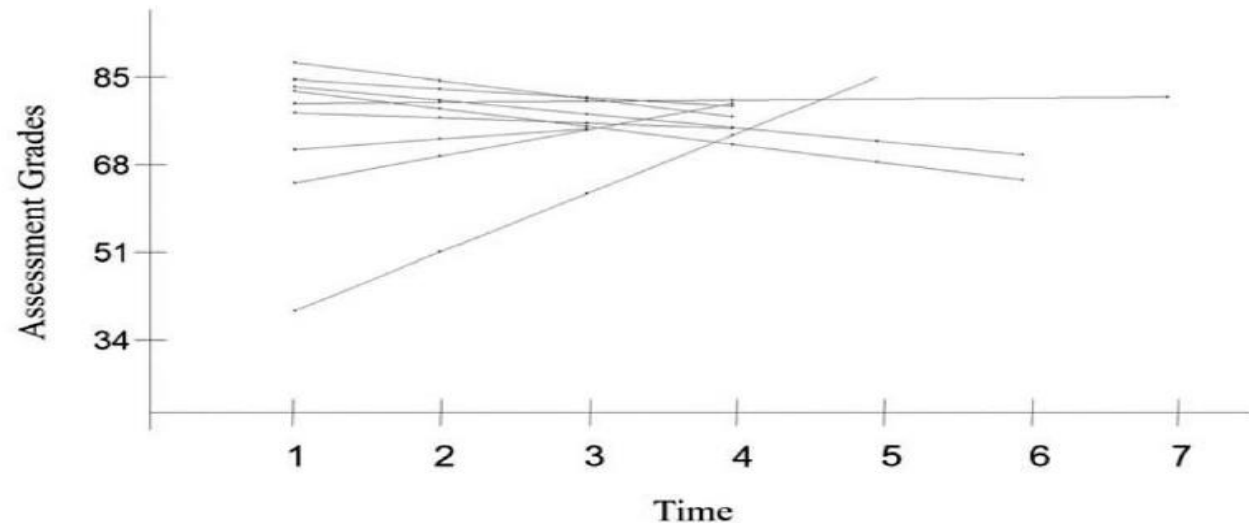
Estimating learning trajectories

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. 117-132). Cham: Springer.

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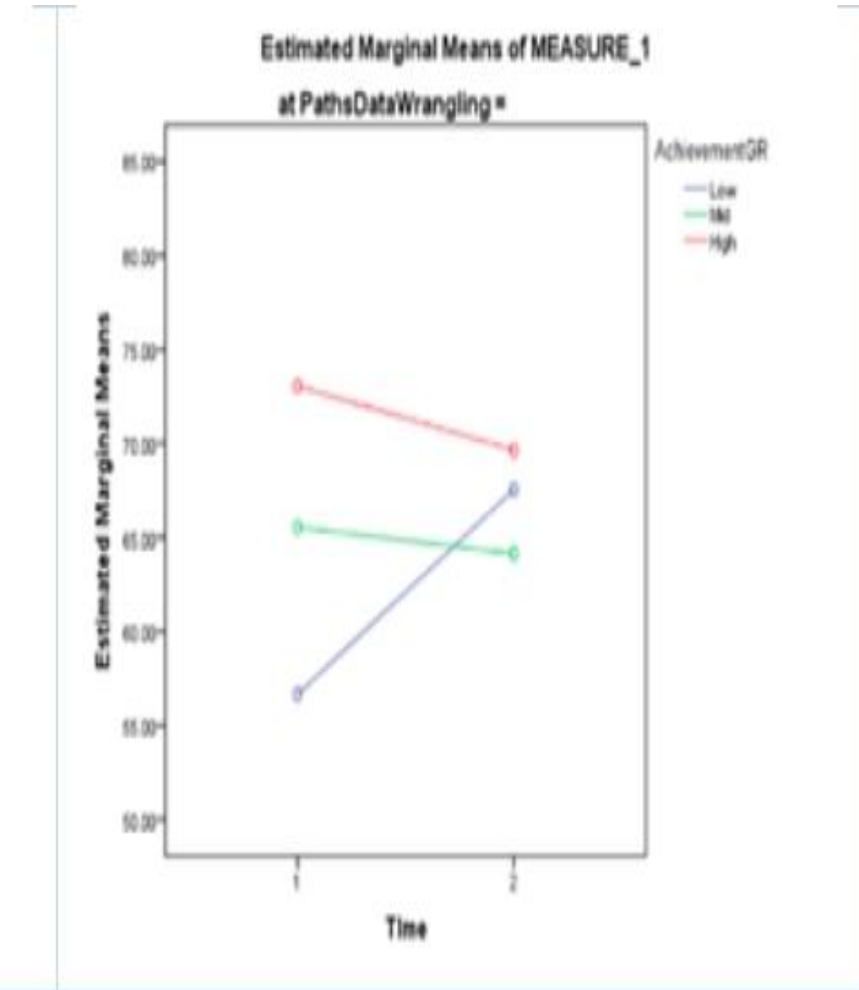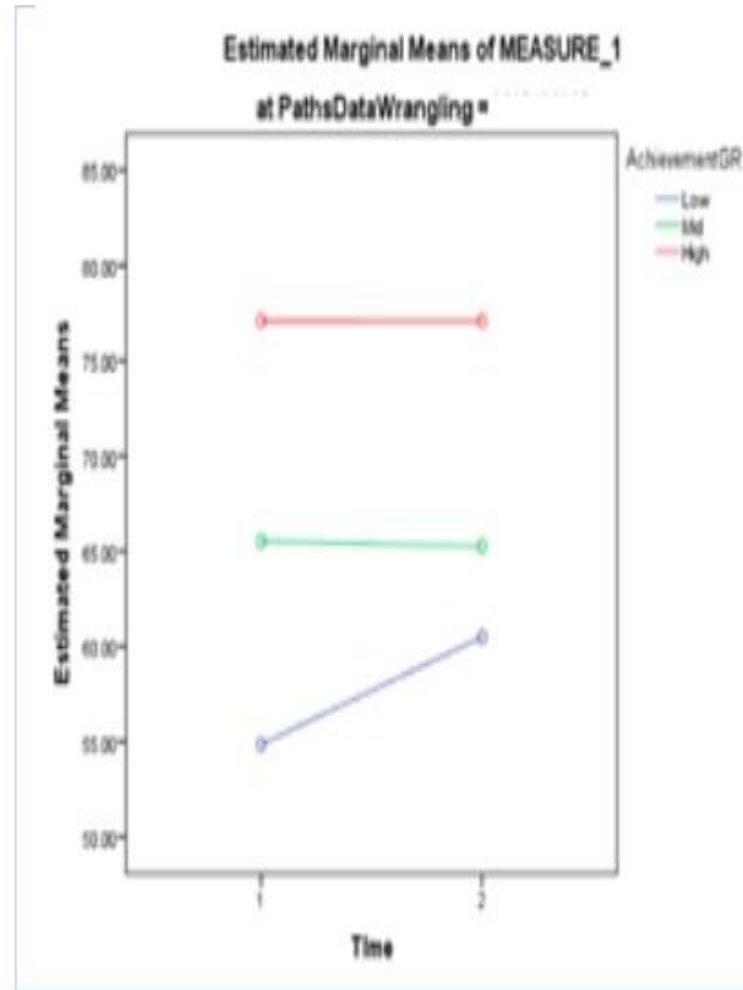
- *5. Cognitive learning gains between institutions*

Module	First assessment M (Median)	SD	Final Assessment M (Median)	SD	Average continuous assessment score 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

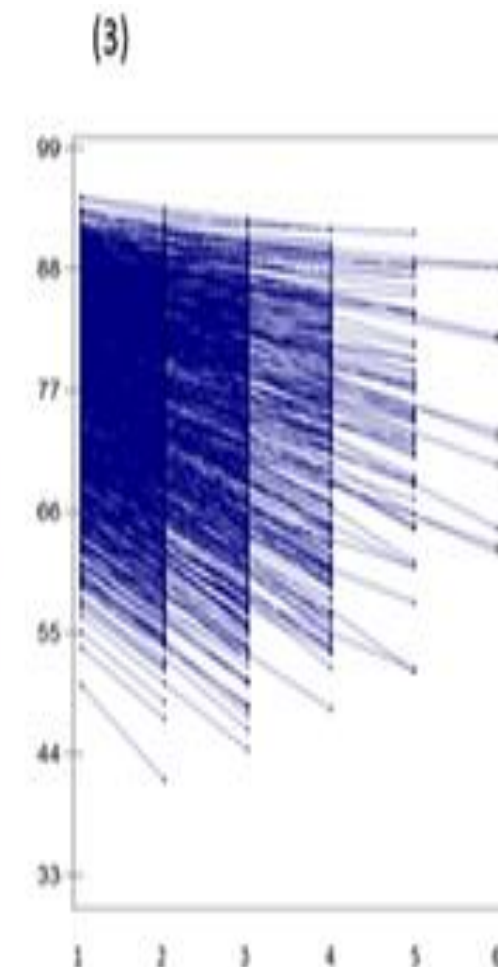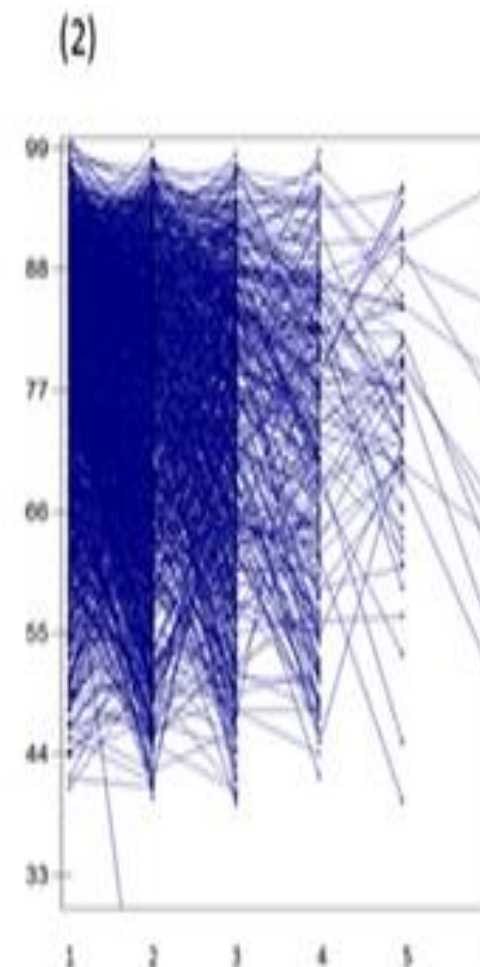Note: The TMAs are marked on a scale from 0 to 100. The minimum passing mark is 40.

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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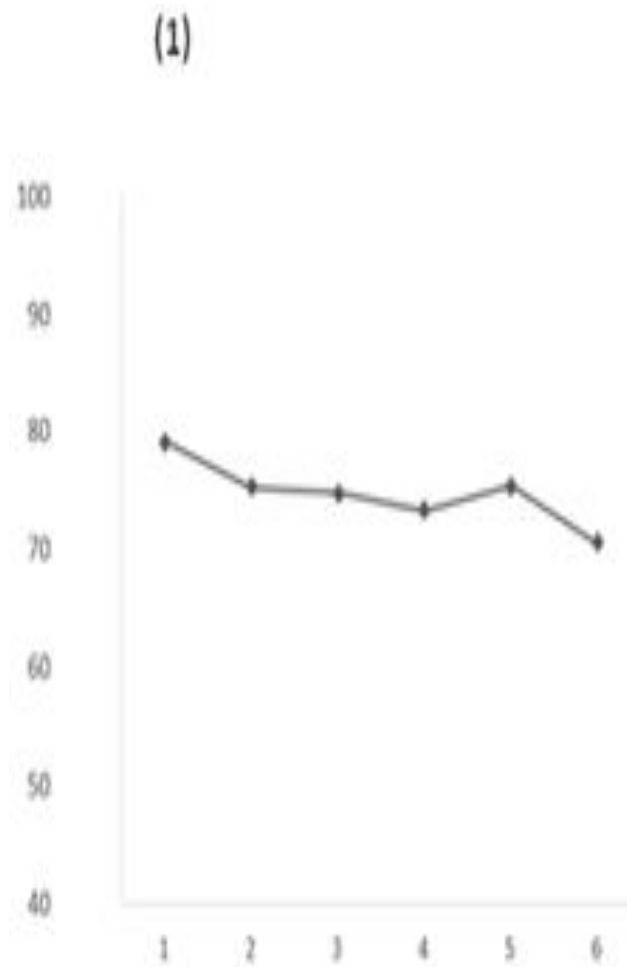
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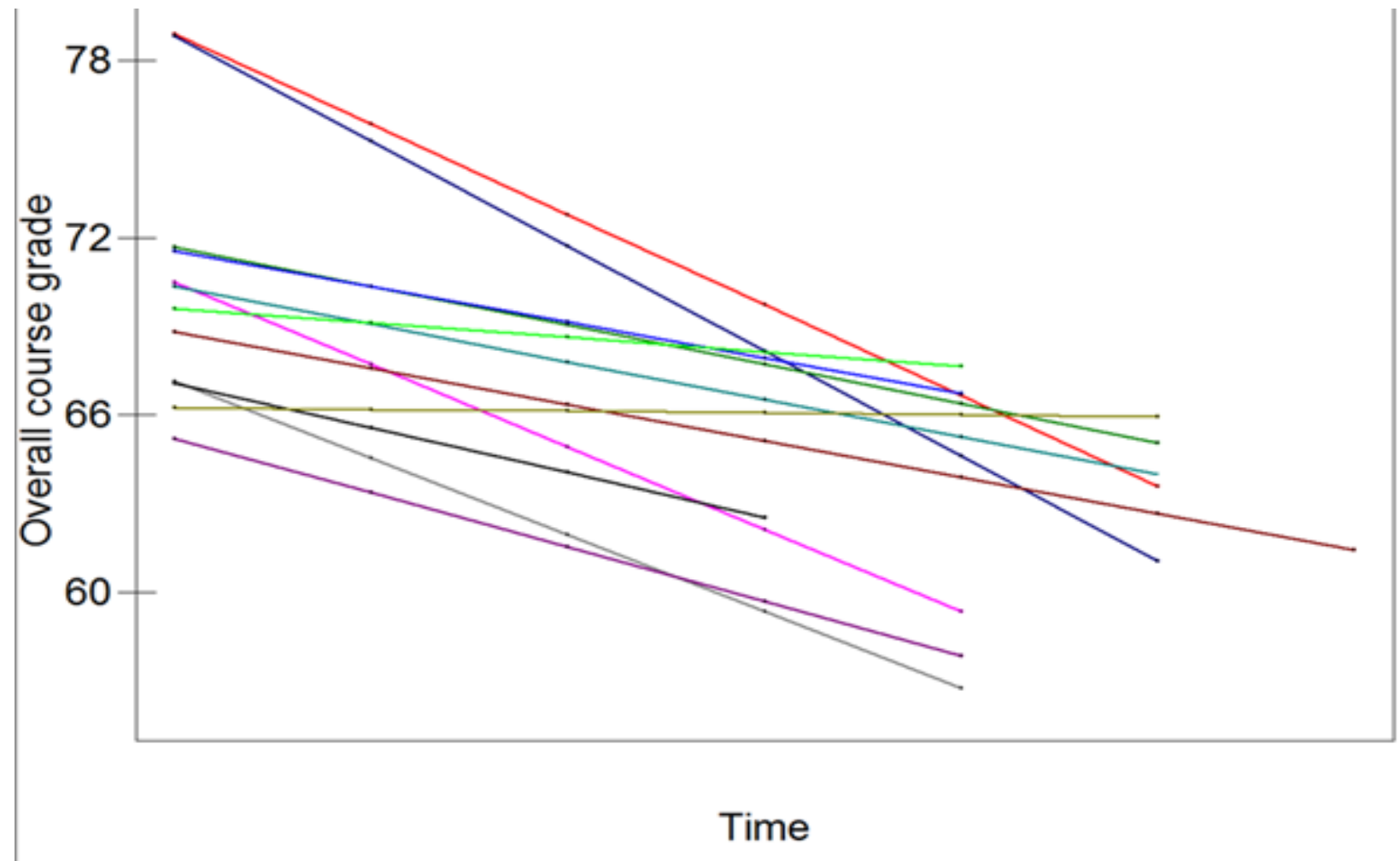
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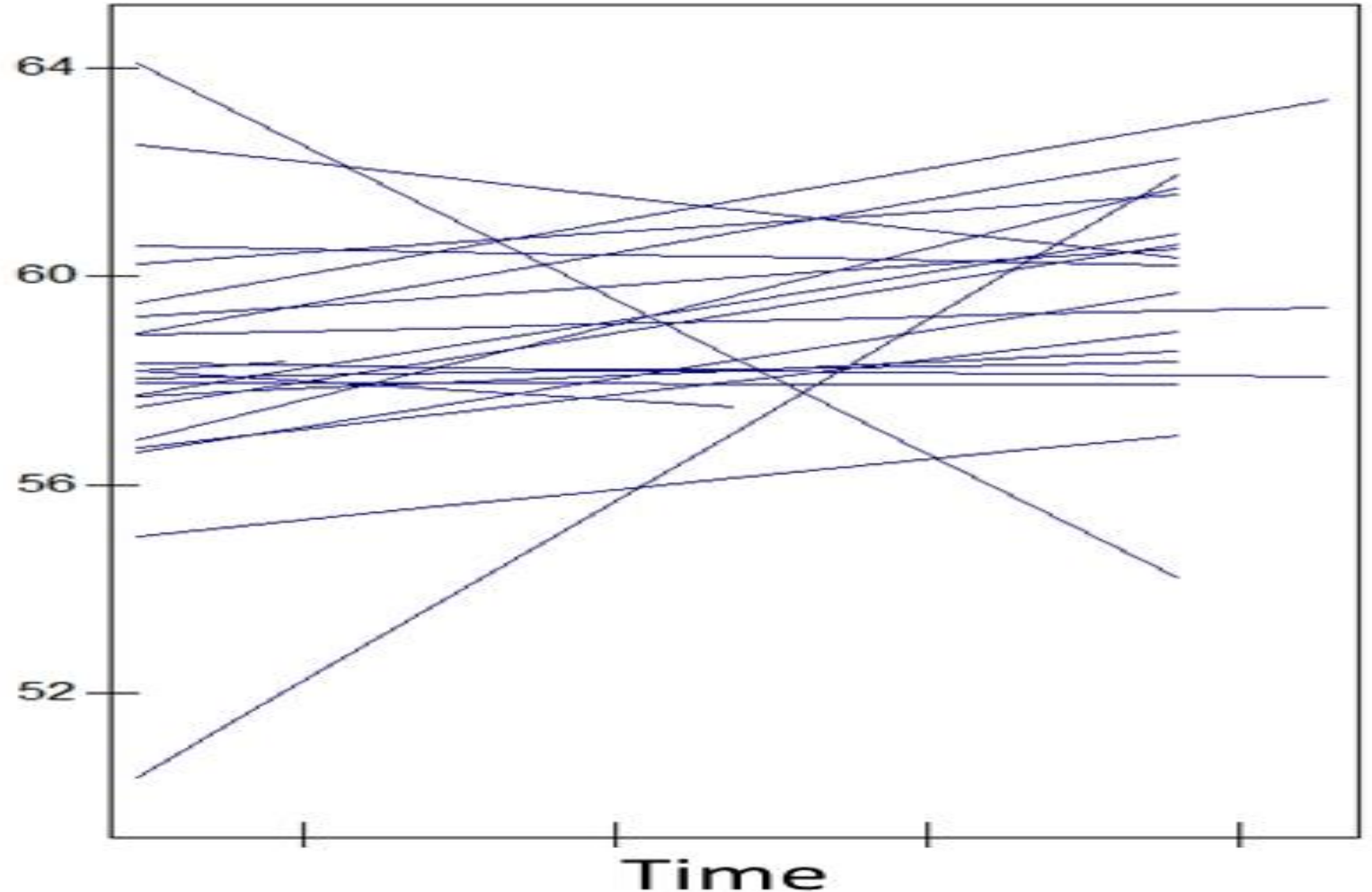
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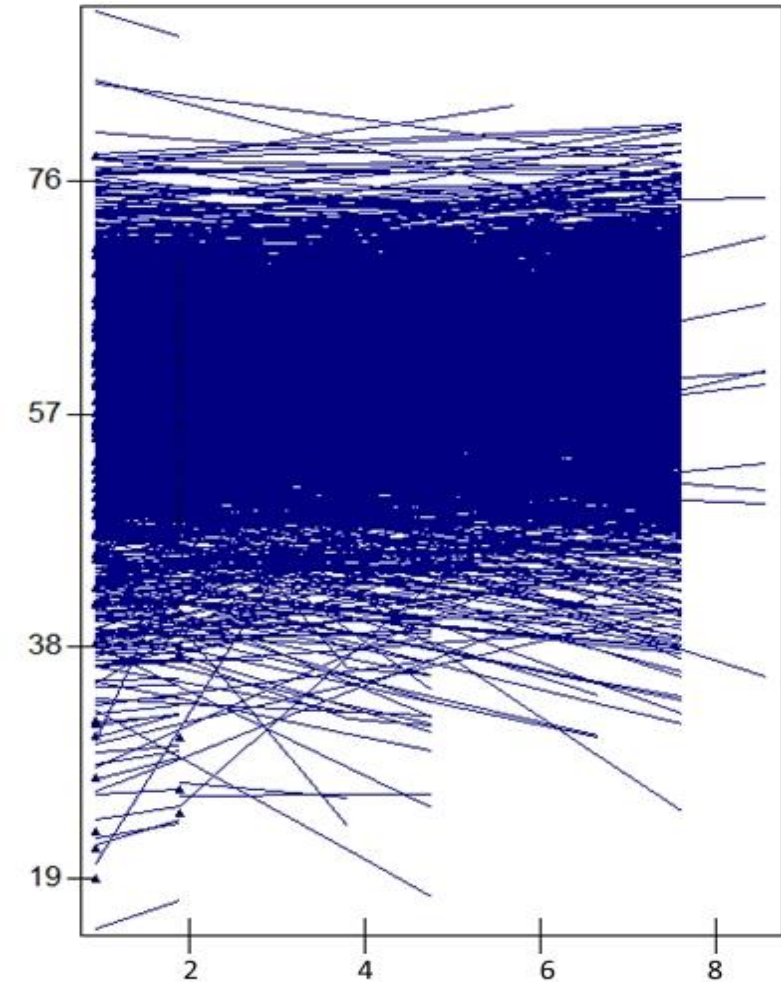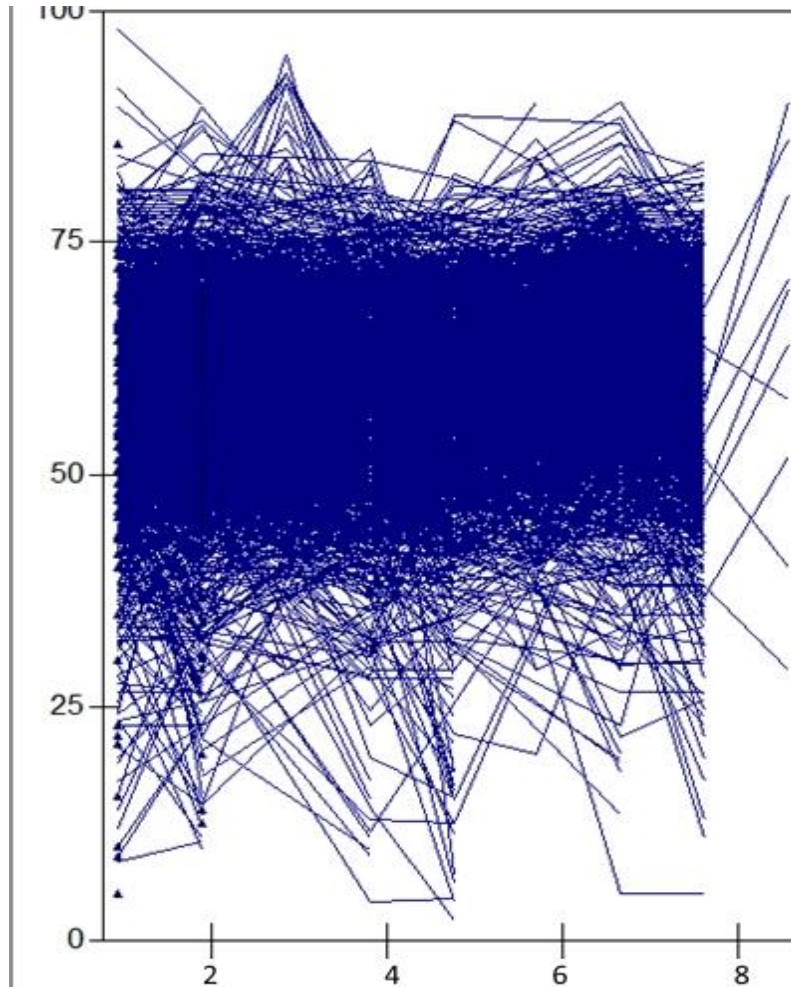
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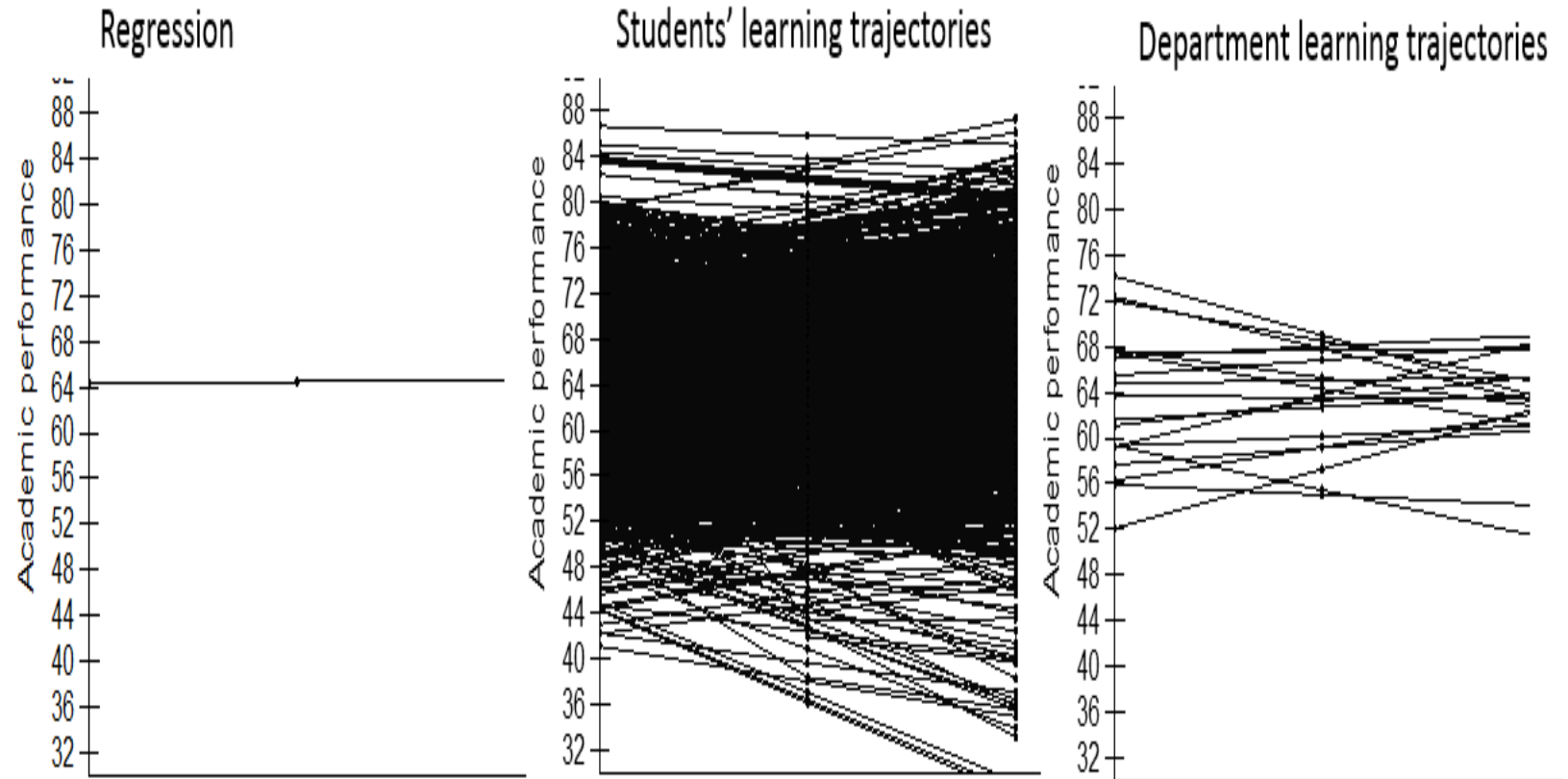
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Regression

Students' learning trajectories

Department learning trajectories

Rienties, B., Rogaten, J., Nguyen, Q., Edwards, C., Gaved, M., Holt, D., . . . Ullmann, T. (2017). Scholarly insight Spring 2017: a Data wrangler perspective. Milton Keynes: Open University UK.

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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)

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.

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

[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 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.

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'.

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

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".