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Nudge your way to student success?

Investigating the link between students' learning intentions and their learning outcomes, experience, and performance

Erkal Ersoy, Rachel Forshaw, & Suzanne Lampert

Heriot-Watt University

@ErkalErsoy

sites.google.com/site/erkalersoy

e.ersoy@hw.ac.uk

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Motivation

- Nudge Analytics
  - Address dis-engagement?
  - When and how?

- Main question: do student intentions translate into action and ultimately affect their final mark on the course?
  - Does saying “I intend to attend my tutorial next week” increase the probability that a student attends their tutorial that week?
  - And if so, what are the implications of this for their final mark on the course?

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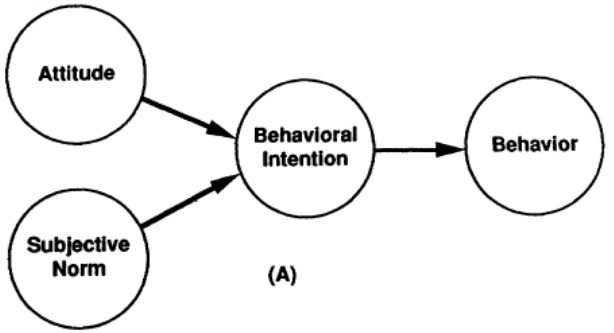
Nudge analytics and related literature

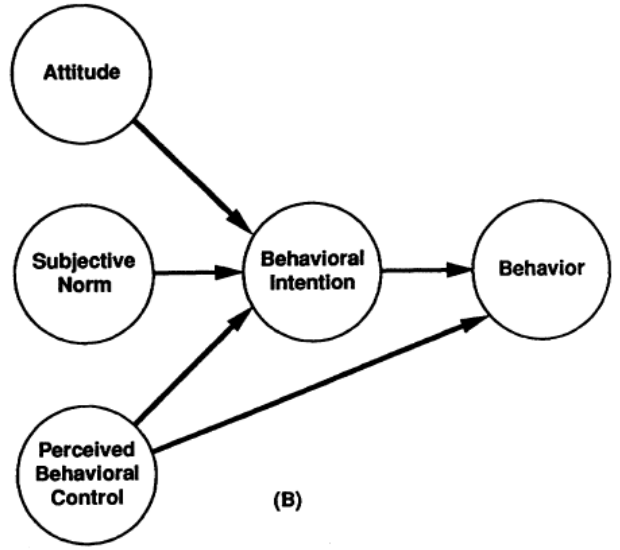
- Brown et al. (2022): appropriate nudges increase students' access to that critical resource. Who, what, and how to nudge matters.
- Weijers et al. (2022): students who made the commitment to attend online lectures did so more often than those you did not commit.
- Vance (2021): students who received nudge communication were more likely to complete their online courses and "their grades were significantly higher than those who did not receive nudge communication."
- Online versus in-person lectures

Theory of reasoned action and theory of planned behaviour

- Madden et al. (1992): "The theory of reasoned action (Ajzen & Fishbein (1980), Fishbein & Ajzen (1975)) posits that behavioural intentions, which are the immediate antecedents to behaviour, are a function of salient information or beliefs about the likelihood that performing a particular behaviour will lead to a specific outcome."

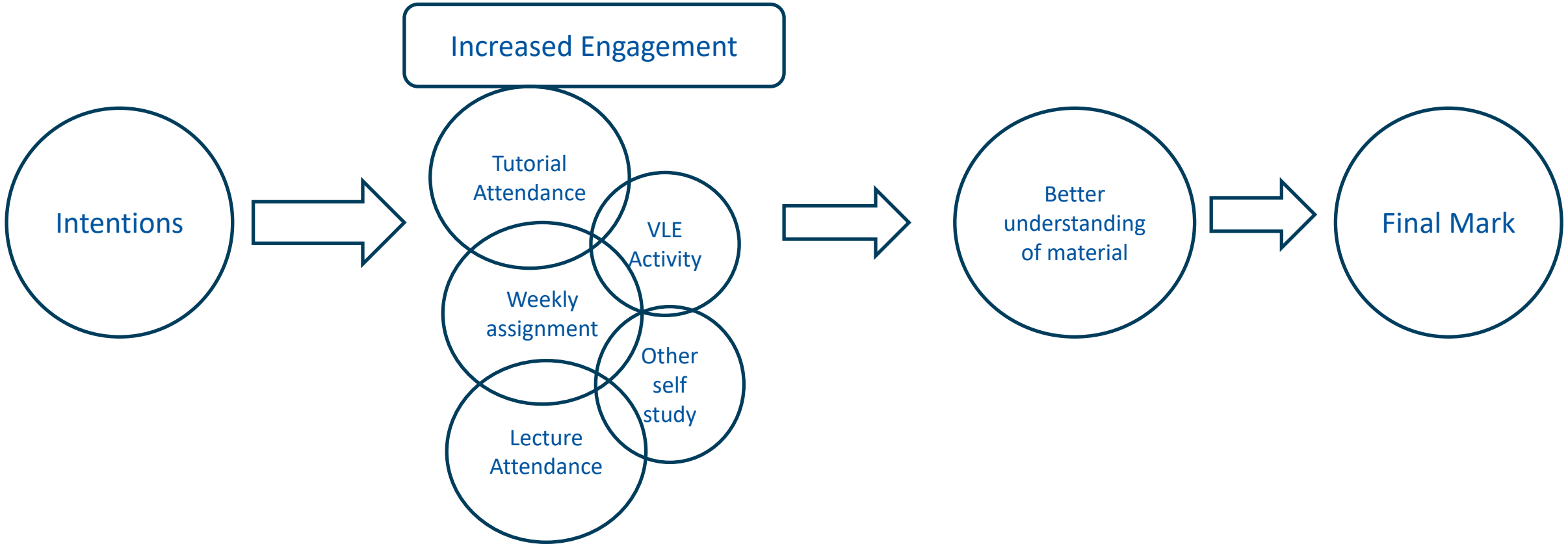
- The theory of planned behaviour extends the theory of reasoned action to include perceived behavioural control.





Source: Madden et al. (1992)

A Direct Acyclic Graph representation (-ish)



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Experimental setup

- First year UG Introductory Economics course
- Common first year within Edinburgh Business School
  - Students from various degrees, including accountancy, finance, and business management
- Around 320 students

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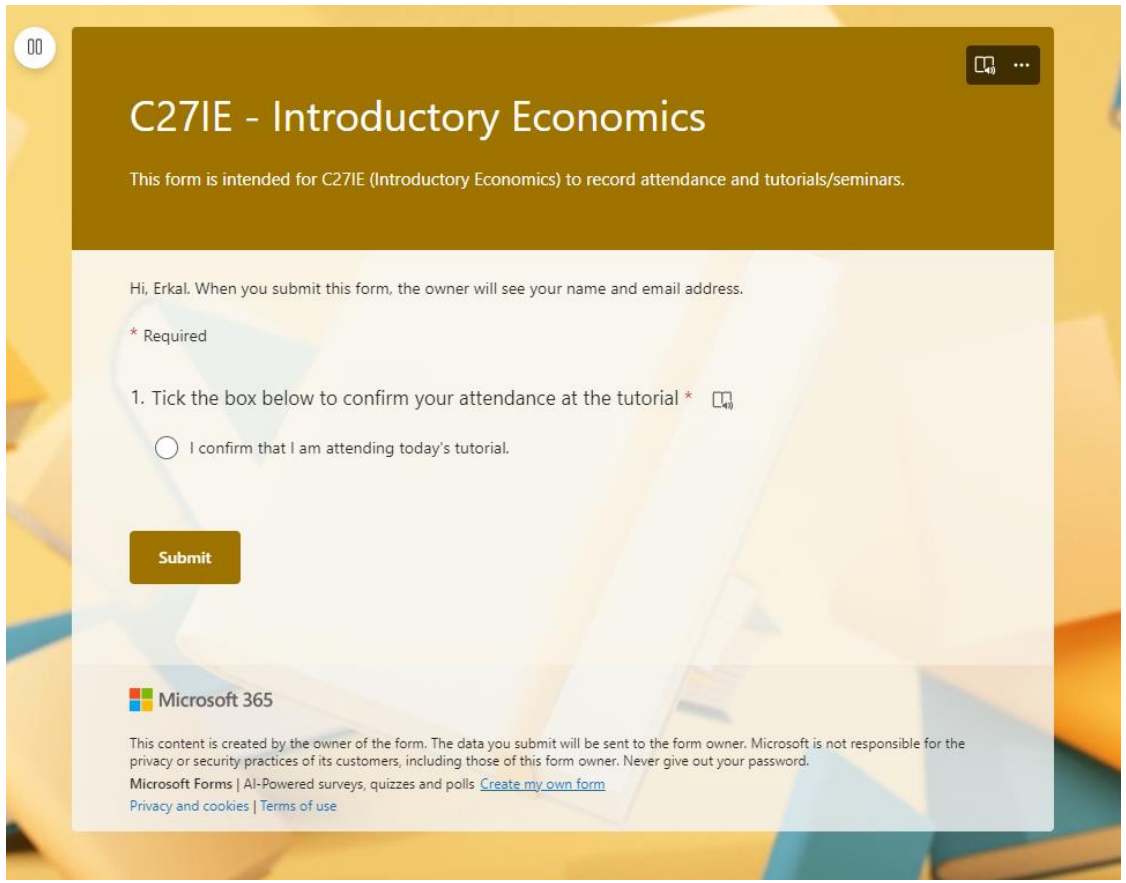
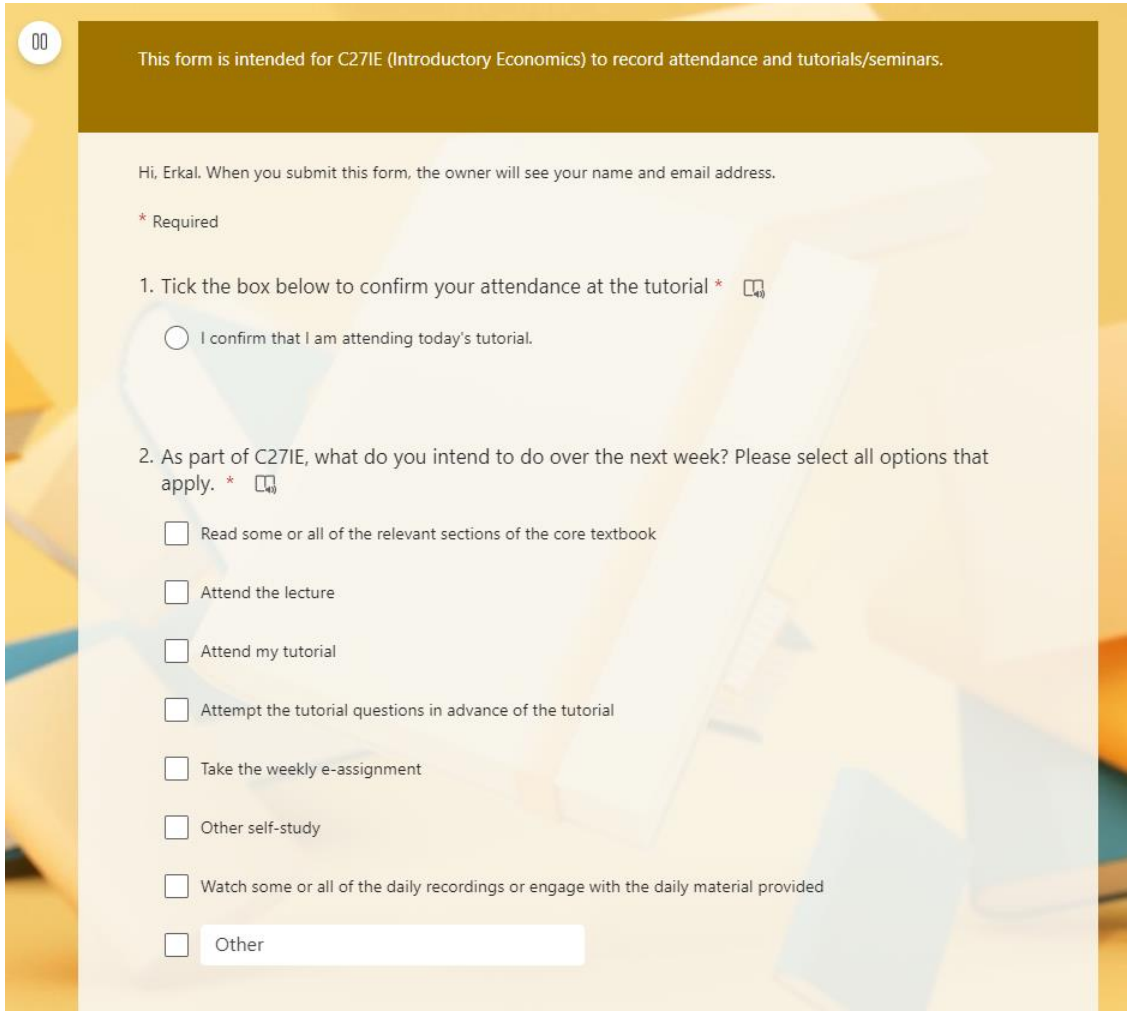
Experimental setup

- RCT style setup: random allocation to treatment versus control
- Double blind
  - Teaching team unaware of students' group membership
  - …but small chance students could work out their treatment versus control status
- Survey given to students at weekly tutorials
  - 8 tutorials in total
  - From week 3 onwards and gap in week 6
- Both groups receive a survey

Experimental Setup

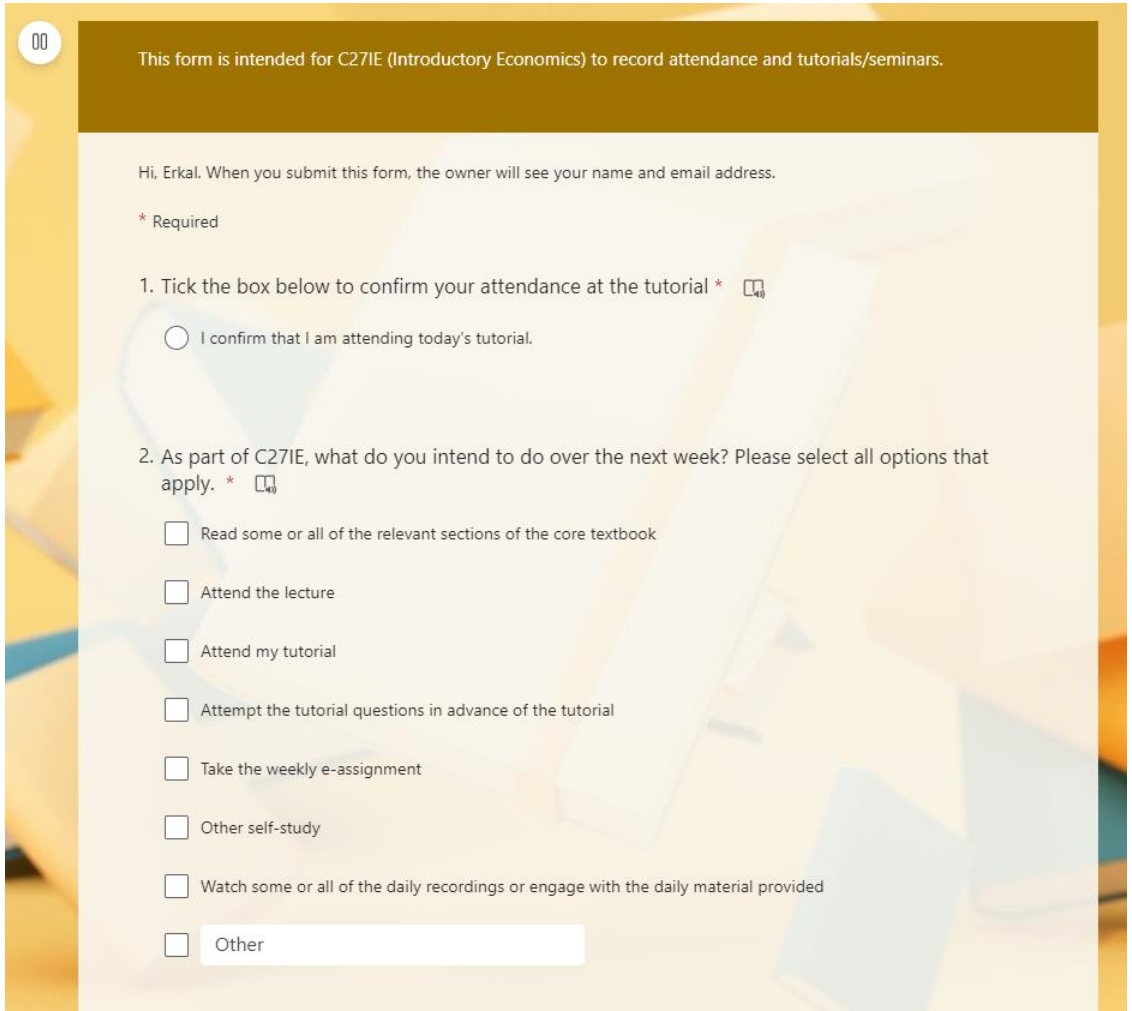
» Both groups receive a survey





Experimental Setup

- Both groups receive a survey
- Random answer order each week
- Very little movement of students between groups



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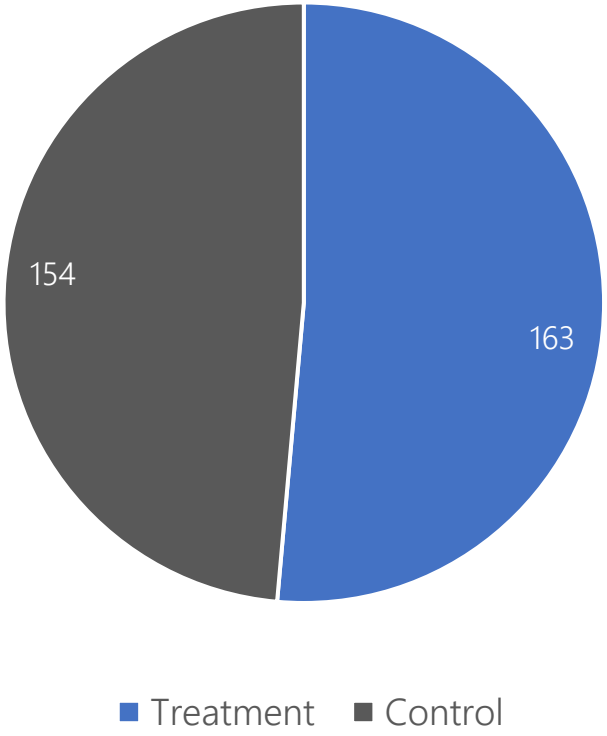
Multiple sources of data and two datasets

- First dataset consists of
  - Course marks, including midterm, weekly assignments, final exam, and overall final mark
  - Tutorial attendance and survey responses
  - Weekly Canvas/VLE activity
  - Other first-year course marks

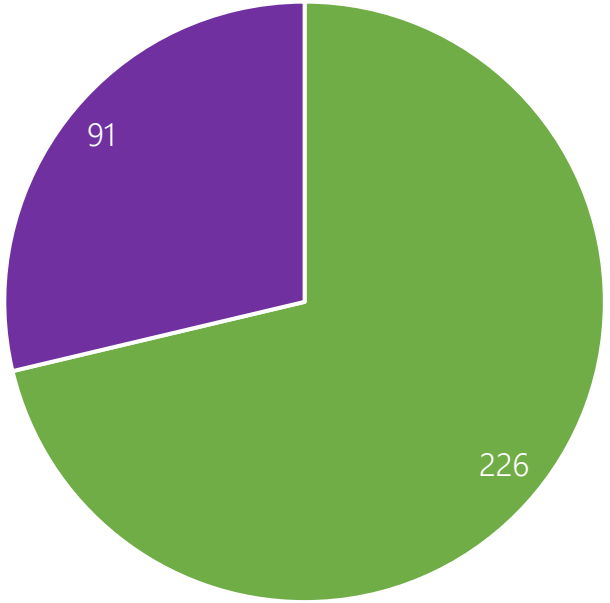
- Second dataset
  - Panel format
  - Weekly observations per student

Summary statistics and observations

Treatment and Control Groups

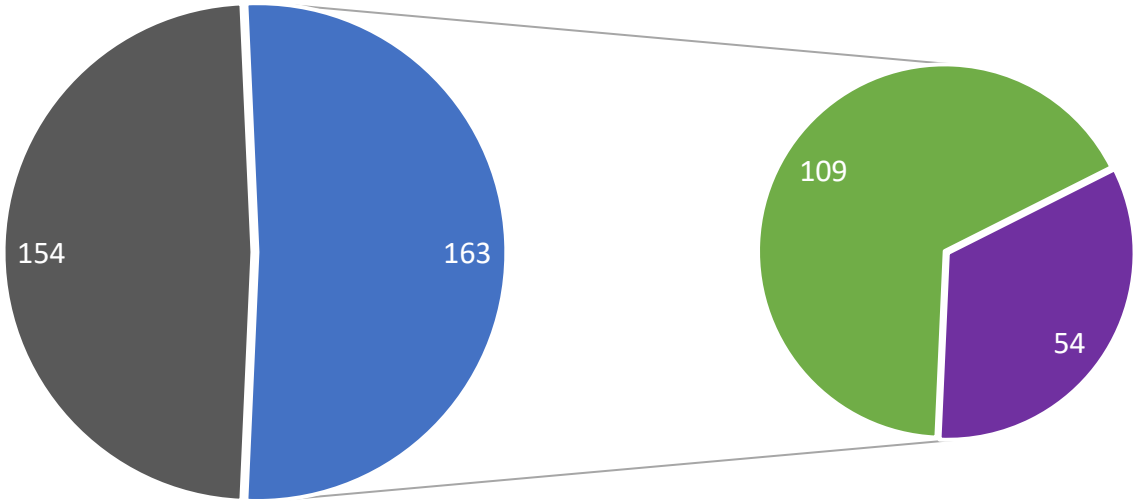


Tutorial Attendance - Whole Cohort



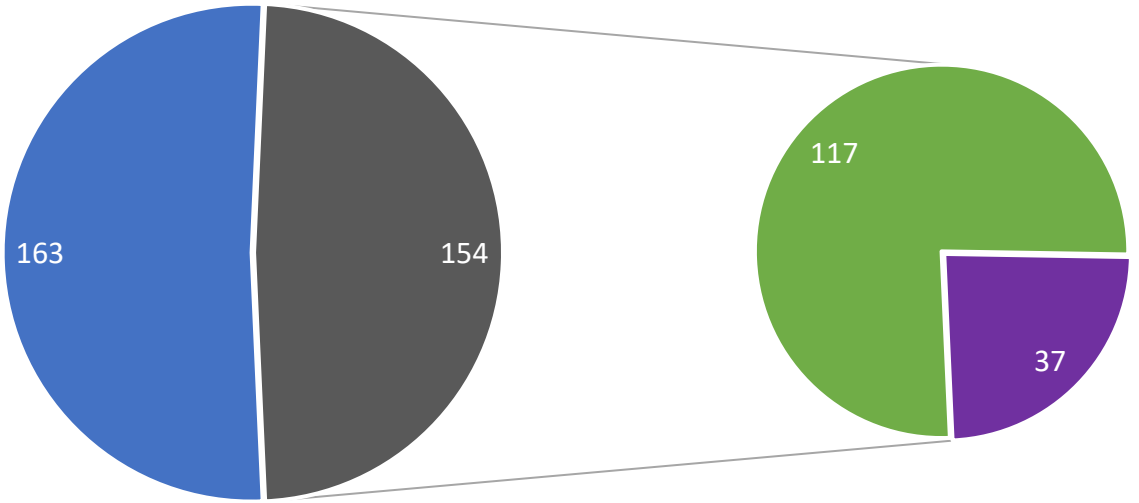
Summary statistics and observations

Tutorial Attendance in Treatment Group



Treatment & Attended Treatment & Did not attend Control

Tutorial Attendance in Control Group



Treatment Control & Attended Control & Did not attend

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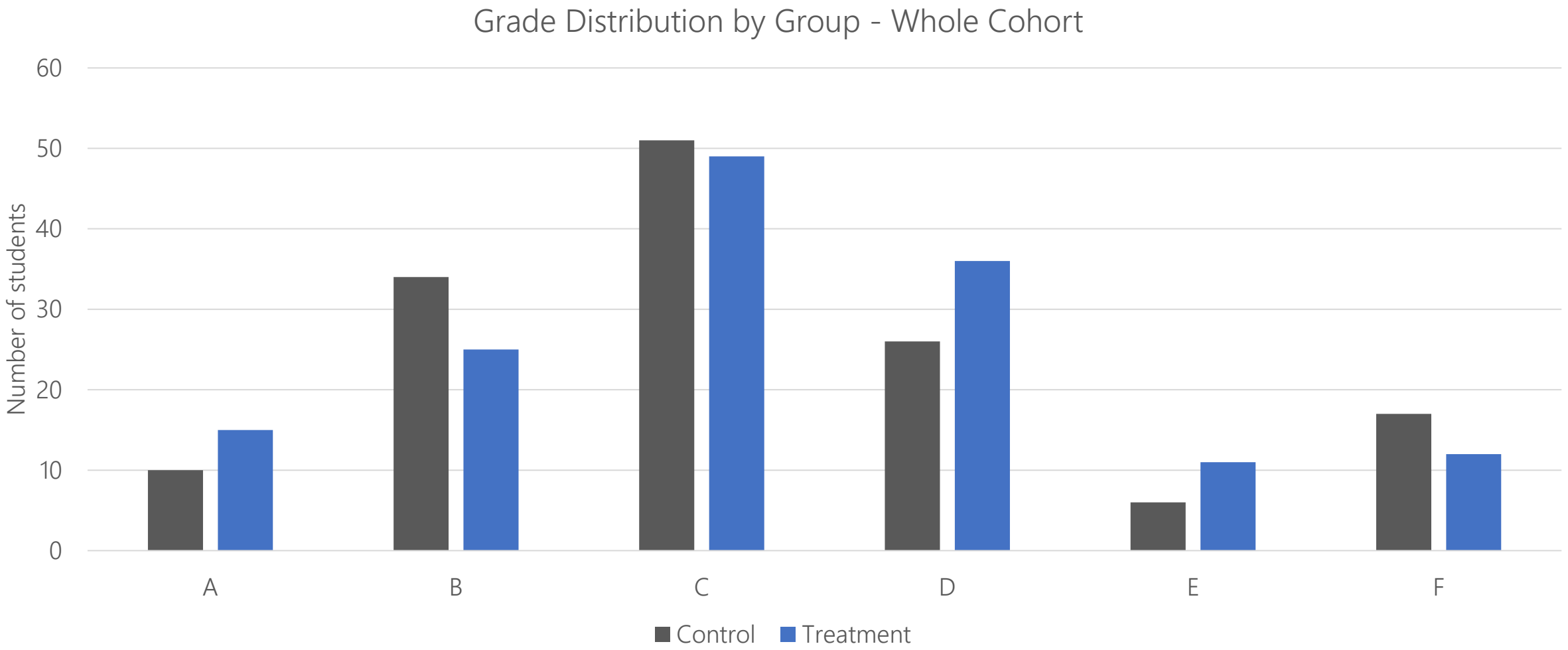
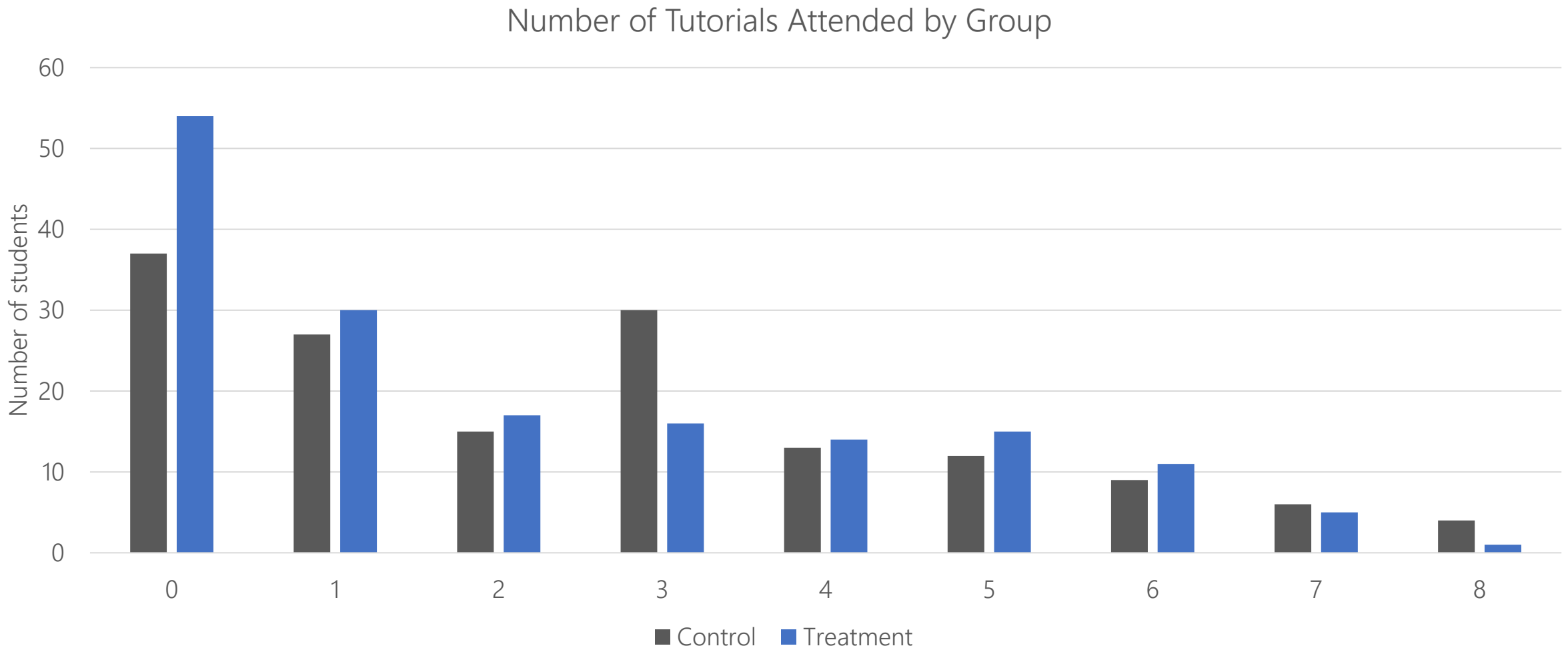
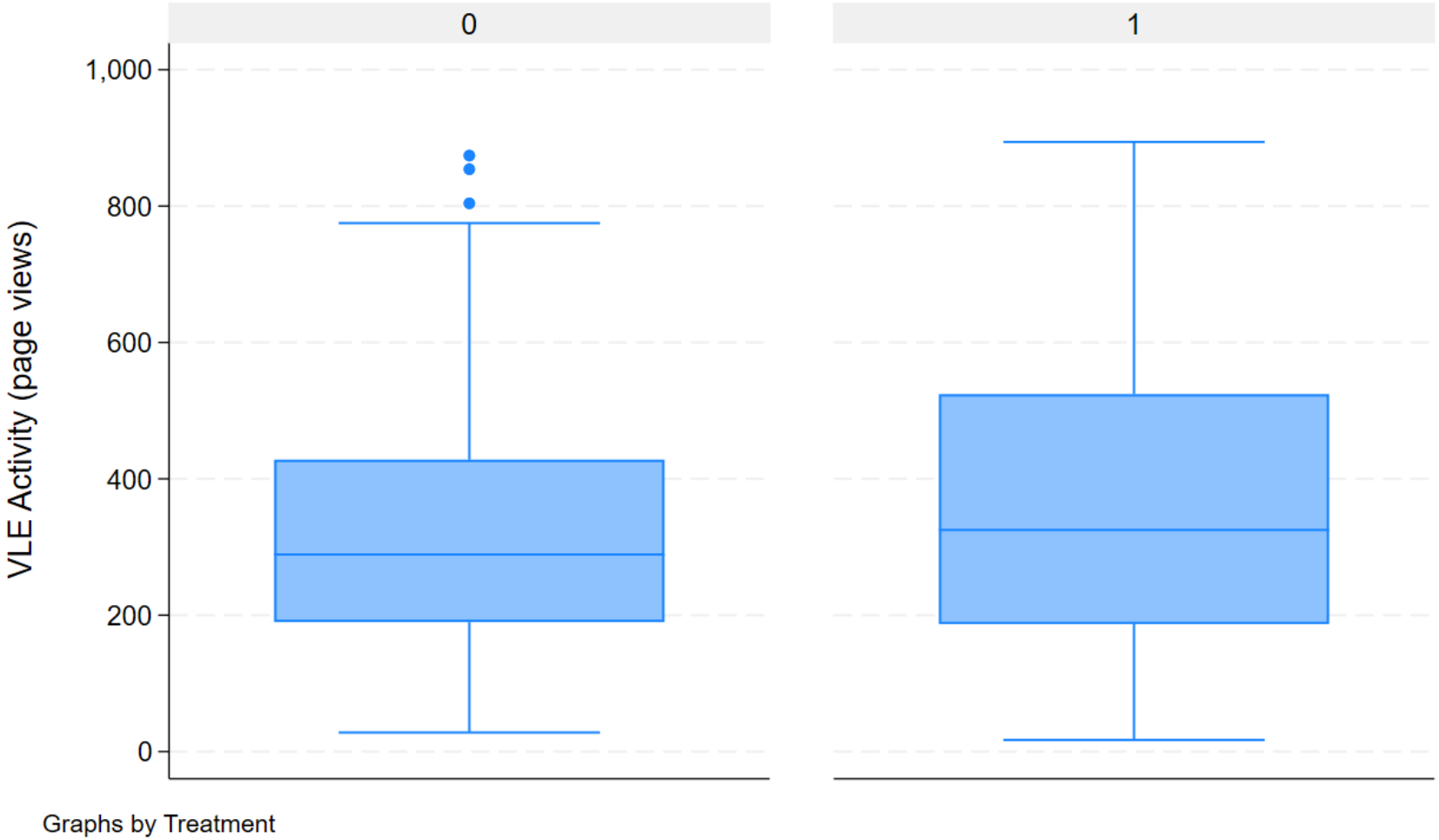
Cohort-level analysis and observations – Grades



Cohort-level analysis and observations – Tutorial attendance



Cohort-level analysis and observations – VLE activity



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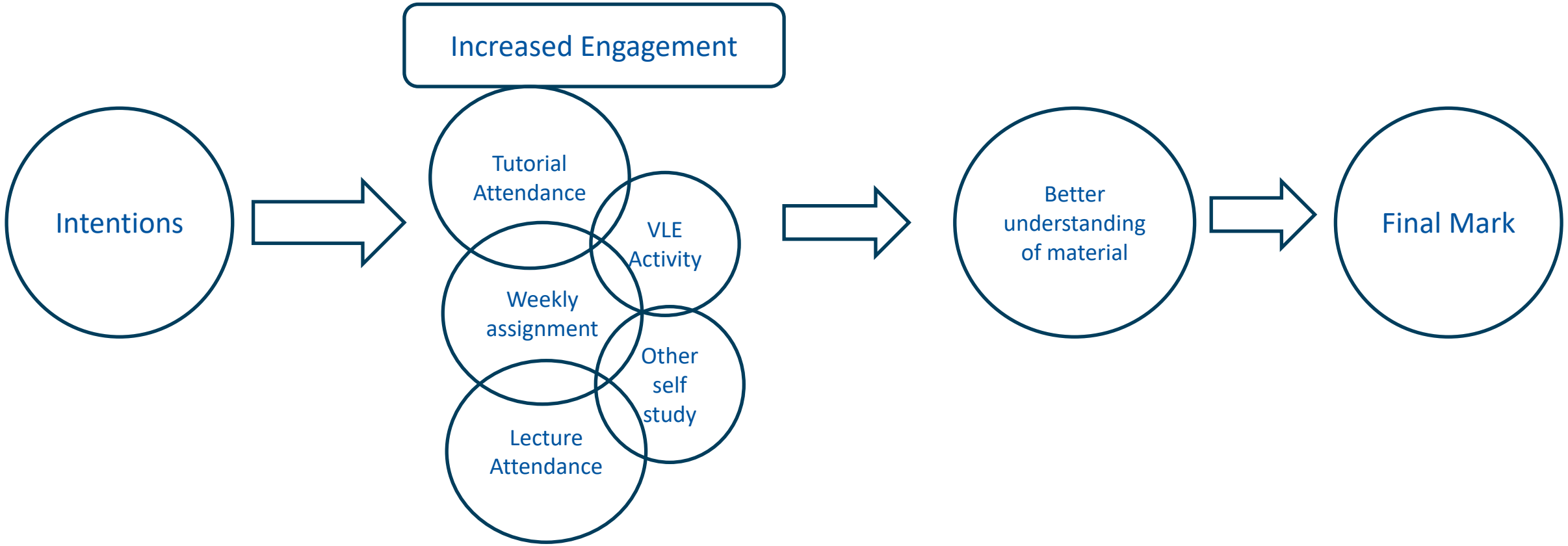
Cohort-level analysis and observations

- No respondent indicated that they intended to read the course textbook!

- Intentions/preferences do not change much at all
  - Respondents chose the same activities week after week despite answer order changing

A Direct Acyclic Graph representation (-ish)



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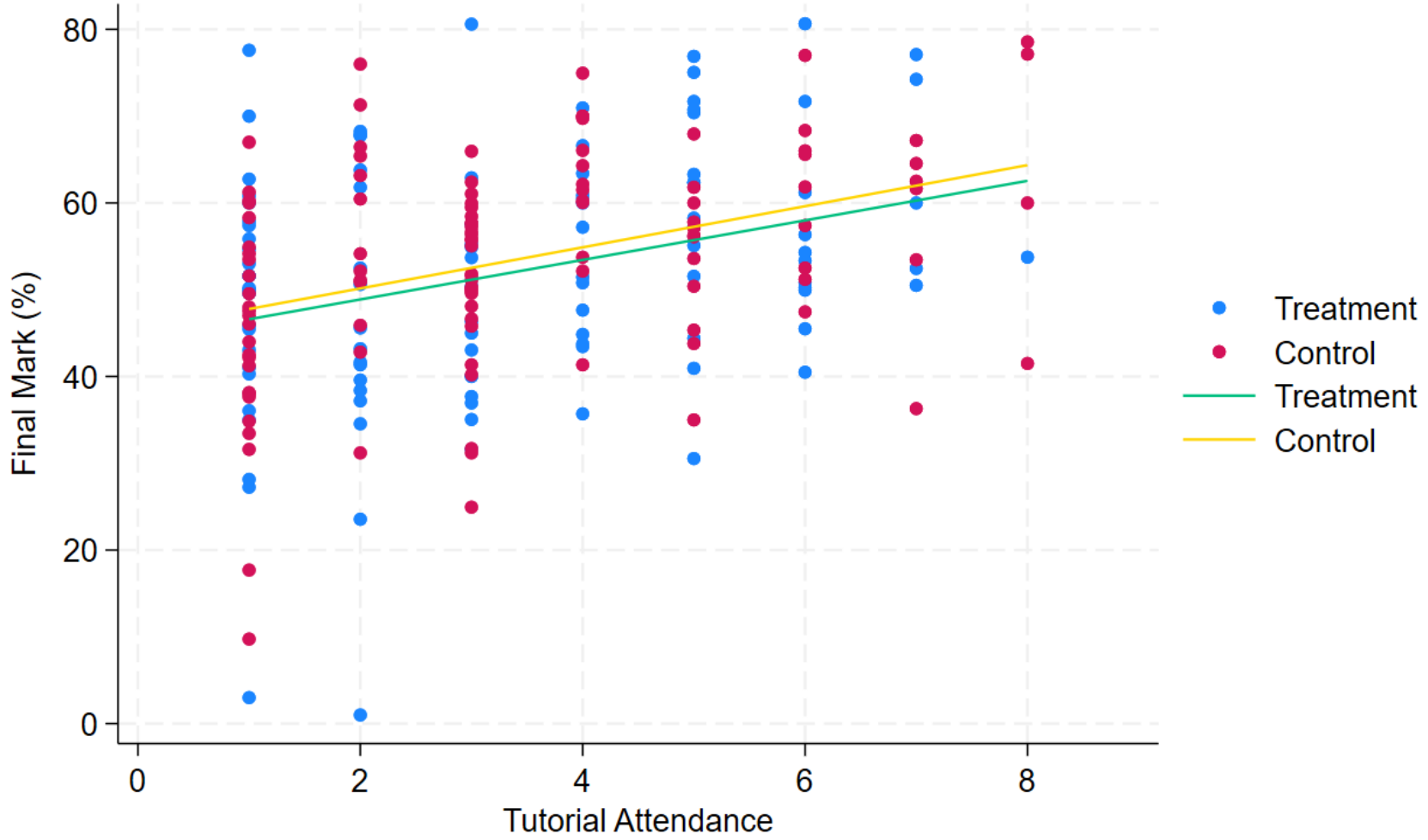
Tutorial attendance and course performance

- Strong link between tutorial attendance and student performance
- Higher tutorial attendance correlated with higher marks
  - Attending one more tutorial predicted to increase final course mark by 1-2 ppt
- Likewise with VLE activity
  - One more page view predicted to increase final mark by 0.01 ppt

Tutorial attendance and course performance



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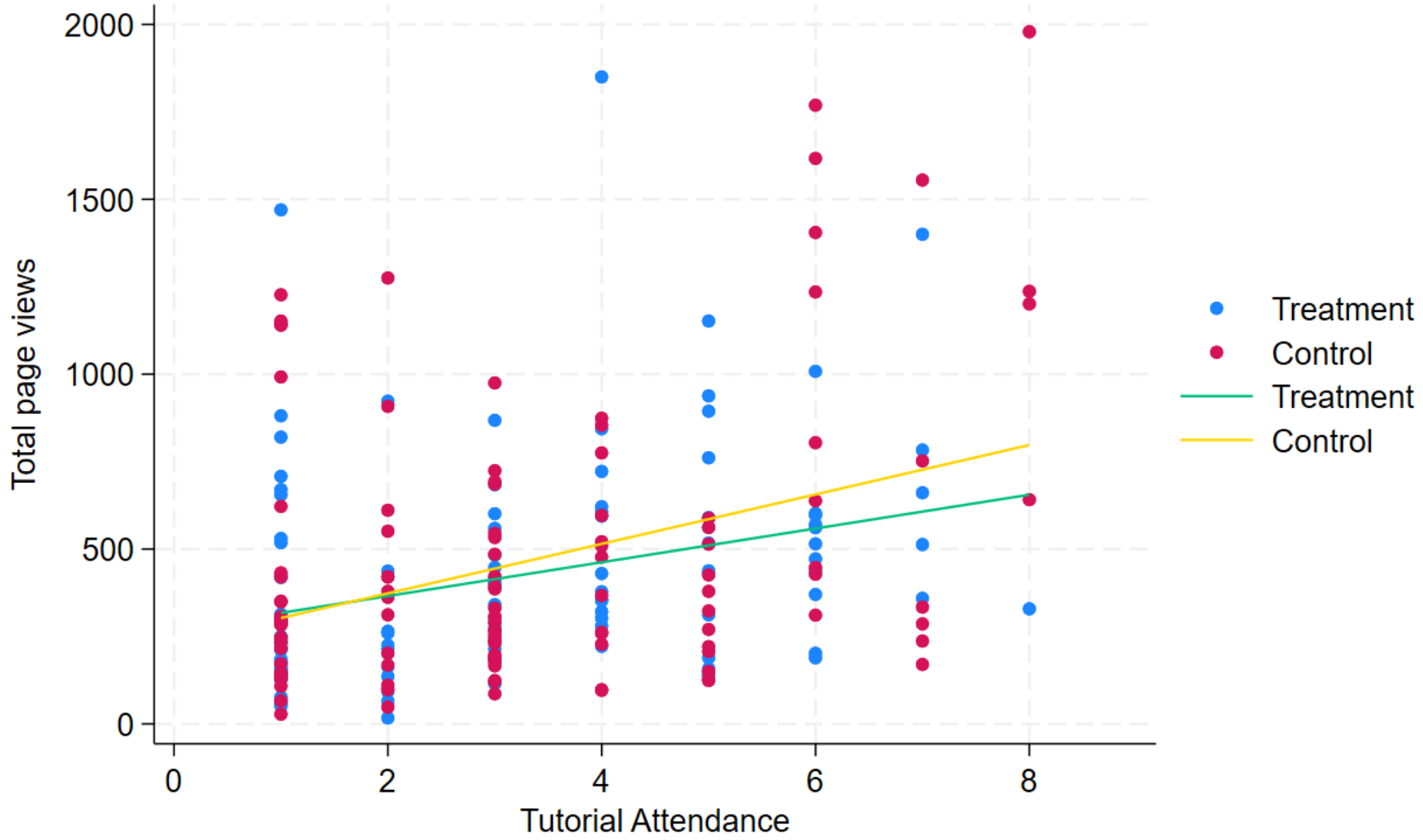
VLE activity and tutorial attendance



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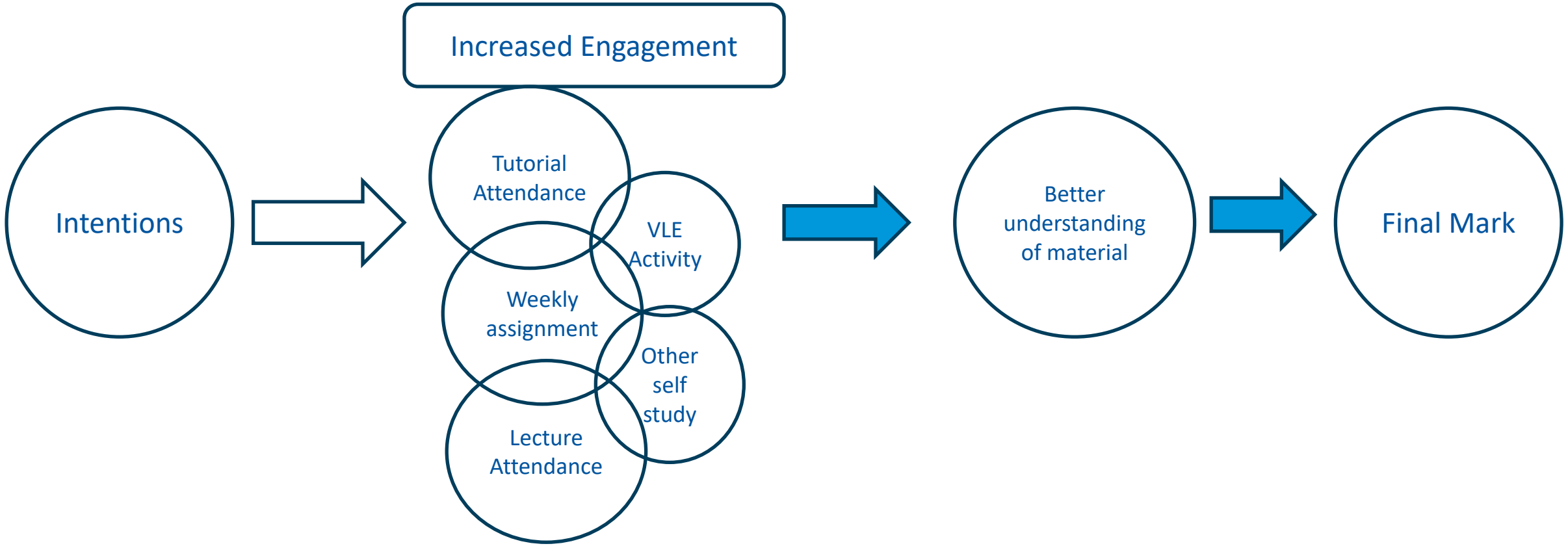

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Intentions and course engagement

- Strong link between intent to attend tutorials and tutorial attendance
  - Intending to attend tutorial correlated with higher tutorial attendance
- Strong link between intentions and final course mark
  - Correlation between indicating “attend lecture” or “attend tutorial” and higher marks
  - Indicating “attend tutorial” one extra time linked to around 1 ppt increase in final mark
- Strength of treatment?
  - Intentions available via survey at tutorials: higher attendance → stronger intentions
- Ability and motivation?

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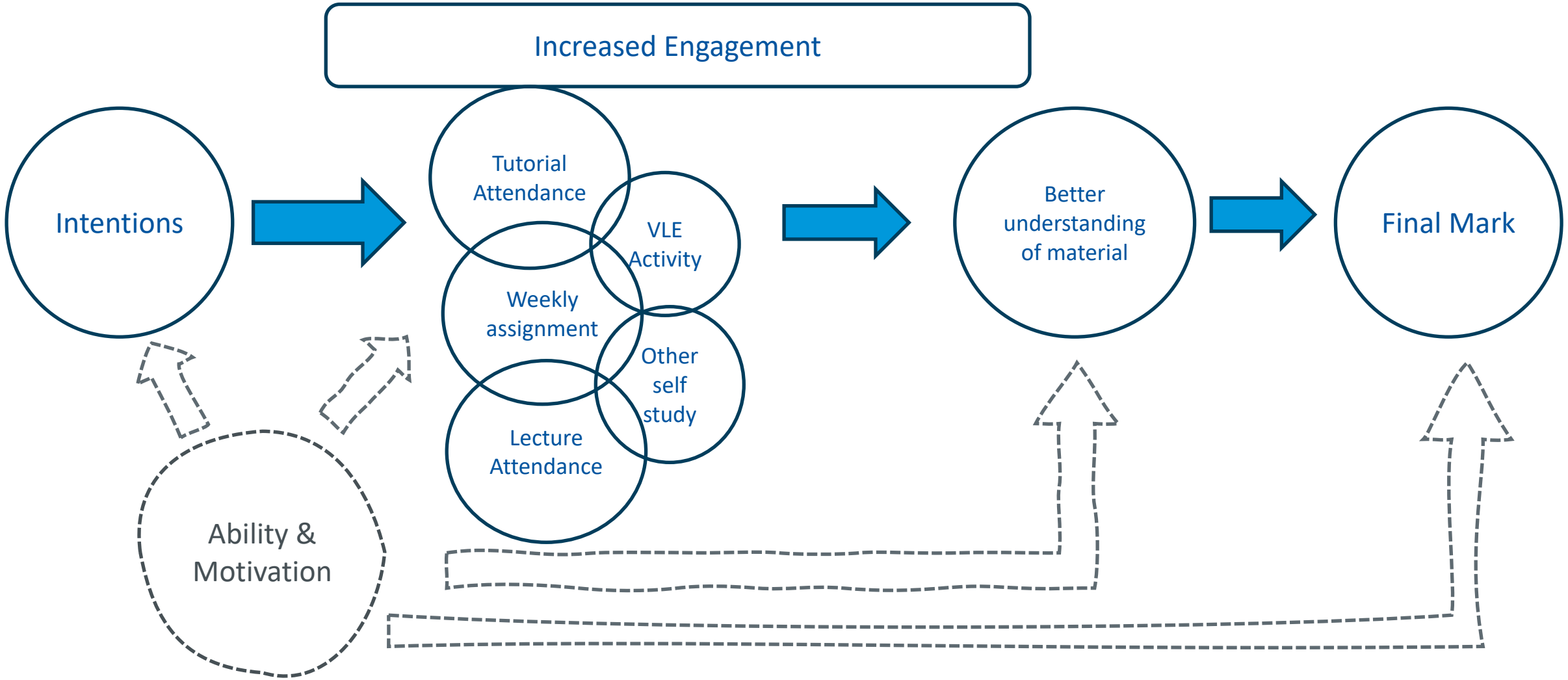

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Intentions and course engagement

- Proxy for ability/motivation: marks on other courses (common first year)
  - Academic Skills
  - Introduction to Accountancy and Finance
  - Introduction to Marketing
  - Management in a Global Context
- Controlling for ability/motivation reduces importance of intentions on final mark
- However, intentions still important in tutorial attendance

Intentions and course engagement

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Intentions and course engagement

- Panel dataset to the rescue
  - Within variation

- Attending the last week's tutorial made students more likely to attend this week's
  - Intent to attend next week's (t+1) tutorial **not** linked to higher tutorial attendance that week (t+1)
  - Intent to attempt tutorial questions in advance was linked to higher tutorial attendance next week

- Intent to attend next week's (t+1) tutorial linked to lower VLE activity that week (t+1)

- Intent to attend next week's lecture linked to lower tutorial attendance that week
  - (Wrong!) perception that lectures and tutorials are interchangeable?

- Intent to do self-study next week linked to higher tutorial attendance that week
  - Self-study followed by clarification questions at tutorial?

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Some remarks

- In this experiment, we were hoping to affect behavioural intention directly (as in theory of planned behaviour)

- Would it be more effective to also think about other factors?
  - Peer support for the behaviour
  - Enjoyment of the behaviour
  - Eliminating potential obstacles

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