

215 How you teach and who you teach both matter: lessons from learning analytics data

Robert Summers¹, Adrian Burgess², Helen Higson², [Liz Moores](#)²

¹TASO, London, United Kingdom. ²Aston University, Birmingham, United Kingdom

Research Domains

Student Access and Experience (SAE)

Abstract

To investigate the impact of disadvantage on student engagement and achievement under different teaching and assessment methods, this study compared the effects of pedagogic changes implemented during the COVID-19 pandemic on the performance and engagement of students from diverse backgrounds using a cohort-study approach. The study analysed learner analytics and academic performance data of first-year undergraduate students across three learning scenarios: (i) in-person teaching and assessment, (ii) in-person teaching with online assessment, and (iii) online teaching and assessment. Findings revealed that the achievement gap between disadvantaged students and their peers was widest when education was conducted entirely online, resulting in poorer outcomes for disadvantaged students. In light of these results, Higher Education institutions should monitor and assess the potential consequences of their chosen educational strategies on different student groups. Both the teaching methods employed, and the demographic composition of the student body are significant factors to consider.

Full paper

The COVID-19 pandemic necessitated the shift to online teaching and assessment in higher education, raising concerns about the impact of digital poverty on education. Studies have reported varying effects – both positive and negative - of this transition. This study used learning analytics to examine the impact of three teaching and assessment approaches on disadvantaged and non-disadvantaged students (categorised using IMD: Index of Multiple Deprivation), investigating attainment, engagement patterns, and their interactions with different modes of teaching and assessment.

Our findings (see Figures 1 and 2) indicated that students from disadvantaged backgrounds experienced poorer outcomes compared to their peers during online teaching and assessment. This was evident in both the percentage of credits obtained and the marks achieved, aligning with previous studies (Bird et al., 2022; Kofoed et al., 2021).

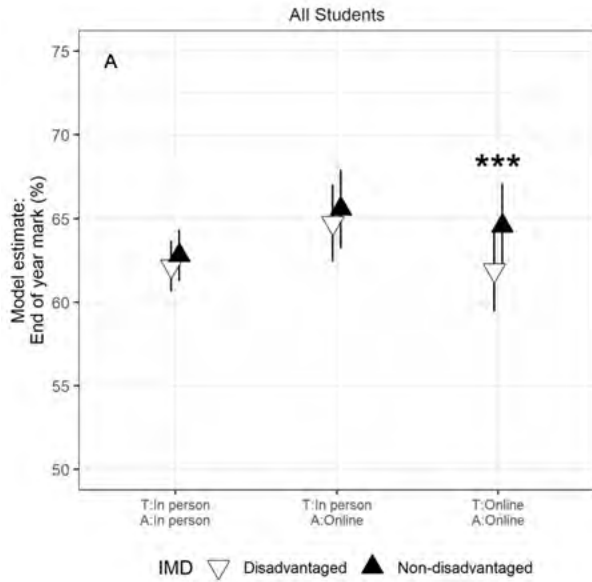


Figure 1: Estimated marginal means of the linear mixed-effects model for end-of-year mark (y axis), (T)eaching/(A)ssessment mode (x axis) and IMD (different symbols). Error bars indicate 95% confidence interval. Asterisks indicate significant differences in attainment between disadvantaged and non-disadvantaged students for the relevant teaching/assessment mode (* $p < .05$; ** $p < .01$; *** $p < .001$).

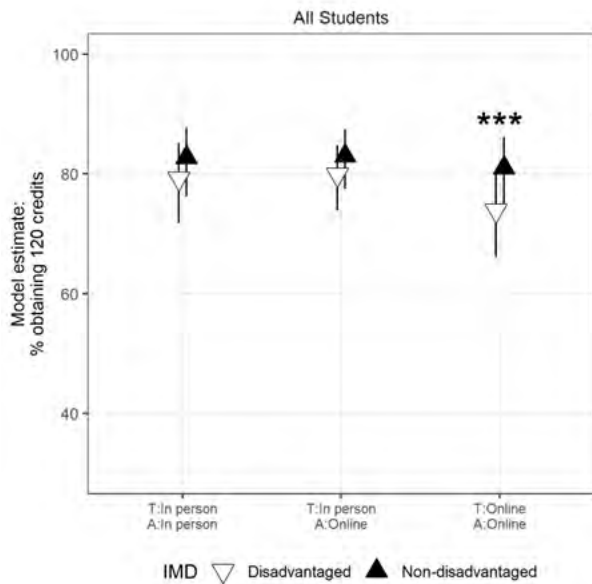


Figure 2: Estimated probabilities of students obtaining 120 credits (y axis) from a logistic mixed-effects model of the relationship between credits obtained (120 credits or <120 credits), (T)eaching/(A)ssessment mode (x axis) and IMD (different symbols). Error bars indicate 95% confidence interval. Asterisks indicate significant differences in credits

obtained between disadvantaged and non-disadvantaged students for the relevant teaching/assessment mode (* p<.05; ** p<.01; *** p<.001).

Cluster analyses showed that while disadvantaged students displayed higher engagement levels than their peers in the in-person teaching and assessment scenario, this association disappeared in online learning (see Figure 3).



Figure 3: Relative proportions of students in each cluster by IMD (left panel=disadvantaged, right panel=non-disadvantaged) and (T)eaching/(A)ssessment mode (different bars). Numbers in brackets are the count of students in each cluster and IMD.

Further analyses were conducted to investigate attainment in each engagement cluster (see Figure 4). The attainment gap between disadvantaged students and their peers was greatest in the low engagement cluster and when teaching was online.

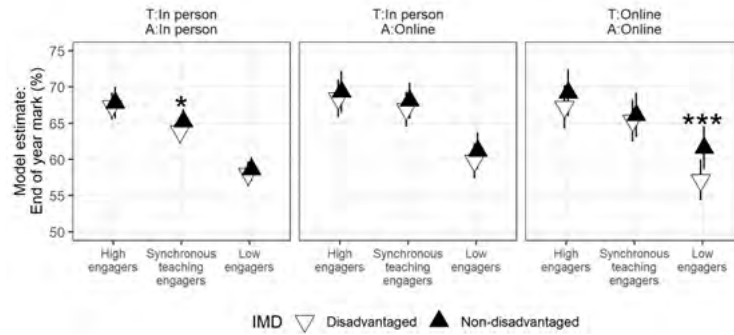


Figure 4: Estimated marginal means of the linear mixed-effects model for each (T)eaching/(A)ssessment mode (different panels), end-of-year mark (y axis), cluster (x axis) and IMD (different symbols). Error bars indicate 95% confidence interval of the mean. Asterisks indicate significant differences in attainment between disadvantaged and non-disadvantaged students for the relevant cluster (* $p < .05$; ** $p < .01$; *** $p < .001$).

Despite similar engagement patterns between the two groups, the attainment gap therefore widened significantly during online teaching and assessment, particularly among students in the low engagement cluster. Consequently, disadvantaged students faced a combination of challenges, including a higher likelihood of being in the lower engagement cluster (linked to lower attainment), overall lower attainment associated with their background, and reduced achievement under the online teaching and assessment conditions compared to in-person teaching and online assessment. Who you and how you teach both matter.

References

- Bird, K. A., Castleman, B. L., & Lohner, G. (2022). Negative Impacts From the Shift to Online Learning During the COVID-19 Crisis: Evidence From a Statewide Community College System. *AERA Open*, 8. doi: 10.1177/23328584221081220
- Kofoed, M., Gebhart, L., Gilmore, D. & Moschitto, R. (2021). Zooming to Class?: Experimental Evidence on College Students' Online Learning During Covid-19. IZA Discussion Paper No. 14356, doi:10.2139/ssrn.3846700