Measuring educational gain:
University of East Anglia case study

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Background
The University of East Anglia (UEA) was amongst the contributors to the HEFCE/OfS "Piloting and Evaluating Measures of Learning Gain" project, which run between 2015-2018. Over this period, UEA piloted three alternative measures for Learning Gain defined as improvement in: (i) entry/exit average students marks (difference in undergraduate average marks between Year 3 and Year 1) undergraduate, (ii) student self-efficacy levels (self-reported during in-class assessment), and (iii) concept inventory test scores (assessing discipline-specific competences at the beginning and at the end of learning modules). Evaluation of these alternative approaches led us to conclude that using average student marks offered significant advantages in terms of scalability; marks are readily available from student records and easily analysed through statistical modelling. Nevertheless, similar to what reported from related projects, we also observed that the pattern of progression varies significantly across the disciplines. Qualitative interviews highlighted that different assessment and marking cultures drive these differences, hindering the opportunity to conduct comparisons, even within the same institution. The evaluation of the other two measures we piloted also generated mixed results, characterised by advantages as well as and disadvantages. Self-efficacy measurements are actively embedded in pedagogy and they are engaging students, but they are dependent on assessment methods, hence more difficult to scale across disciplines. Concept inventories offer an accurate account of gains in competences and skills, but students have no incentive to engage with them, which poses a challenge to data collection.

## UEA's Definition of Educational Gains: Closing Attainment Gaps
The University of East Anglia identifies as an access institution; we recruit from areas populated by individuals who are affected by significantly higher level of challenge across multiple dimensions of deprivation and disadvantage, compared to national averages. Our Access and Participation Plan aligns with our inclusive mission to close gaps in attainment between students from historically underrepresented or disadvantaged groups and their peers. For this reason, whilst selecting amongst alternative measures for Educational Gain, quantifying our ability to close attainment gaps across different groups of students felt the most natural and obvious choice. Our previous work on comparing student average grades at the beginning and at the end of their educational journey proved to be very helpful in building our methodology, with a shift in focus on attainment gaps.

Methodology and Limitations
Our methodology builds on a simple procedure. We consider the pool of students who graduated at UEA between 2017 and 2021 (in line with TEF benchmark timeframes). For each of these students we calculate the average of the marks received in Year 1 and Year 3; we then proceed computing the difference between these averages, which are proxy of the distance run by students in terms of attainment, and represent our operational definition of Educational Gains. Finally, we break down our sample across different groups of students and compare average gains across groups. These groups are formed on the basis of Widening Access and Participation (WAP) demographic categories: race, disability status, age (mature students versus younger students), and index of multiple deprivation (IMD). This approach shares some of the limitations identified in our earlier Learning Gain Pilot Project. The most significant weakness of our methodology lies in the fact that we are not controlling for differences across subjects, nor the interaction between subjects and their demographic pool. Mitigating factors are (i) the fact that averaging across subjects might smooth the effect of different marking and assessment cultures, and (ii) the fact that we have proactively intervened to address this difference in marking cultures since they were highlighted by our previous investigations. It should also be noted that, although results might be skewed by the lack of control variables in our model, this does not imply that our methodological approach is intrinsically biased. It only means that more accurate results will emerge once we include the interaction between subject and demographic group, along with including other demographic and behavioural variables, such as gender and engagement proxies. The timing for this more complex modelling was not practicable over the short period available to design our first TEF submission embedding Educational Gain.

Results
The preliminary results of our appraisal of Educational Gain expressed through Attainment Gaps are summarised in the following diagram:
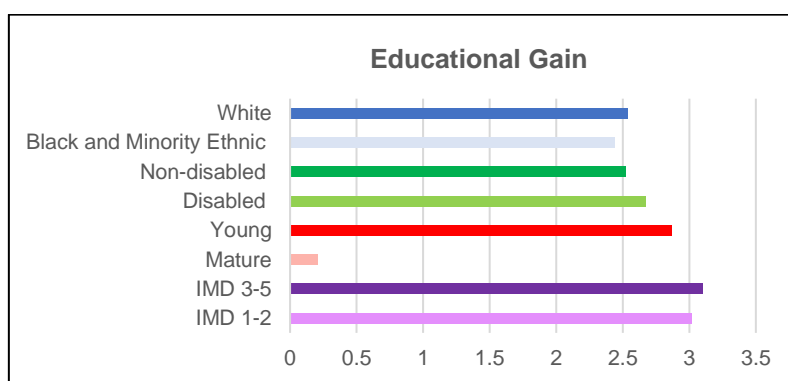
With the caveats we discussed in the previous section, it can be observed that differences between average marks in Year 3 and Year 1 are all positive. More importantly, we also found that gaps amongst demographic groups are small and statistically insignificant, with the exception of the experience of mature students. To validate the good performance evidenced in the diagram above, we could not rely on data from other institutions. Nevertheless, the Office for Students provides data on the proportion of good honours degree broken down by demographic group, which we used to benchmark UEA's performance to compose the following table.

Comparison group	Sector Gap (%)	UEA Gap (%)	Smallest Gap
IMD quintile 5 to 1	14.8	11.0	UEA
Ethnicity White to Black	17.4	14.0	UEA
Ethnicity White to Asian	5.8	4.0	UEA
Ethnicity White to Mixed	2.5	5.0	Sector
Ethnicity White to other	8.2	5.0	UEA
Young to Mature	9.5	3.0	UEA
No disability declared to disabled	1.1	-2.0	UEA

With exception of one category, UEA outperforms the sector according to this metric. Therefore, our findings allowed us to demonstrate that, using the closest available benchmark to the sector, our internal Educational Gain results deliver a consistent and plausible message: students associated to the great majority of WAP demographic groups perform equally well. We take pride in this result, as it perfectly aligns to our mission.

Conclusions and Future Directions
As discussed in our Methodology section, we are aware that our modelling strategy needs improvements. We have a clear direction and the necessary data to embed these improvements, as well as the time needed, in preparation for the next TEF submission. Work in underway to construct a panel regression model that accounts for the evolution of the attainments gaps year by year, and the effect of control variables and their interaction at the same time. In the light of the recent debate on 'grade inflation' in the HE sector, concerns could be raised about the use of attainment data to measure excellence. Nevertheless, when the focus is on the gaps amongst different demographic groups, these concerns are of second order. We believe that our most significant achievement was designing, implementing, and validating a metric that is aligned with our inclusive mission. The metric is scalable and relatively easy to compute. It will be developed and perfected, and it can be monitored and evaluated on a rolling basis to create a dynamic indicator of excellence.