Student Views on Degree Classification Algorithms: An Intertextual Account of a Student-As-Researcher Investigation

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ABSTRACT

This article presents an account of student-led discipline-based educational research (DBER) into the weighting placed on the first year in the classification algorithm of a UK Chemistry degree. Using an innovative form of writing (an intertextual commentary on the research output), the experiences of both the student and the supervisor are contextualised within an account of the specific project.

The product of the research suggests that a weighted first year would encourage Chemistry students to work harder without making the transition into higher education harder. Student views varied interestingly with year of study and programme of study.

The process of this research suggests that empowering students in the design and execution of their research can be an enormously satisfying experience for everyone involved. In this case, the research has been greatly enriched by the student identifying a fascinating gap in the literature.

KEYWORDS
Classification Algorithm, Intertextual, Student Voice, Motivation, DBER, Chemistry

> …*the first year should count! I've worked just as hard as I would normally so feel it is unfair! I've paid for it, I've worked hard for it, it should count!*

> *Having first year weighted would help reduce any stress for fourth year MChem students, as the majority of the final grade seems to be made up from the fourth year.*

> *I think it is fine being unweighted as it gives students time to become accustomed to the work and topics involved, without the added pressure of results going towards the degree.*

INTRODUCTION

The position of students in English Higher Education is changing. The political landscape has advanced economic models of students as 'consumers' of education, with high tuition fees leading to headlines describing the scale of graduate debt. This model has led to a greater consideration of the 'Student Voice'.

Students' views can be fragmented, hard to interpret, and coarsened through the use of standardised reporting instruments such as questionnaires. Developing ways of listening to students at a programme level is challenging, particularly on pedagogical decisions such as the degree classification algorithm, and there is a rich tapestry of conflicting biases on such reflexive issues (for example, Little, Locke, Scesa, & Williams, 2009).

One common approach is using student representatives ('reps') to act as consultants on issues involving the Student Voice, (Little et al., 2009) yet the general student population's faith in such representation at course level has been described as 'shaky' (Carey, 2013) perhaps due to: students' time pressures; limited training for reps, low student motivation to engage with the rep process, and the fraught power dynamic associated with students complaining to staff about course-related problems (Brennan & Williams, 2004).

While the capitalised singular term 'Student Voice' is adopted in most of the policy documentation, writers such as Baird have argued convincingly for the use of the term 'student voices'; this term emphasises the heterogeneous mix of student positions and expressions (Baird et al., 2017). We adopt the term 'Student Voice' throughout this paper to align with the language of policy makers, but recognise the value of the term 'student voices' (indeed, our findings confirm significant diversity in student views on the classification algorithm).

FRAMING THE PROJECT

This project can be considered in two ways. It is a pilot investigation into students' views on an important issue: the weighting which first year is accorded in their degree classification algorithm. It is also a methodologically innovative way of approaching the Student Voice: the work was carried out by a student (JW) as part of a 60-credit module at Level 7, and was supported by formal academic tuition (from MO). This positioning of the student as an academically-mentored researcher might be seen as a particular embodiment of Carey's vision for student representation (Carey, 2013):

> *radical collegiality[…] offers a model of reciprocity in the development of the student, the tutor and the institution.*

To this end, this paper has been written in an unusual style. Subjective commentary from co-authors JW and MO is embedded throughout the report of the research. We feel that this is an engaging way of reporting both the product (articulating student views) and the process (a student-as-partner investigation) of the project (Woolmer et al., 2016). This extends a co-authored reflective writing style aligned with the SAP model (Hubbard et al., 2017; Seale et al., 2014) by embedding intertextual commentary on the project throughout the article. Seale et al. (2014) have noted that "there is a lack of detail and criticality with regards to… exactly how genuine partnerships can be achieved"; we hope that our commentary creates a valuable resource to support the emerging 'pedagogy of partnership' (Healey, Flint, & Harrington, 2016).

JW: Approaching the project, I was very much in favour of an unweighted Year 1. I'm not quite sure why I was so convinced that the only answer was a 0% weighting, however a couple of key things stand out. During the latter part of my 3rd year, and throughout my 4th year I worked within the University's Widening Participation office and I think I was particularly keen to recognise the transitional aspect of the first year over others. I think undertaking this at a 4th year student allows a lot of reflection as well, both on my own journey and the journey of others. Perhaps having seen peers struggle to adapt with the already 0% weighting lends itself to not increasing the pressure from the status quo.

It was interesting to research this with the almost certain knowledge that it wouldn't directly inform any policy change, as it allowed the project the room to breathe and grow organically, without needing to worry about its impact too much.

MO: I am an early-career, teaching-focused lecturer. My own experience of formal education had an unweighted first year, and I was surprised to hear that this Department had once had a 10%-weighted first year – I'd never even considered that this might be an option. The issue intrigued me, and – finding no literature on *pedagogic* rationales for classification algorithm design – I was keen to explore the issue further having just taken up the post of Programme Director. Accordingly, I drafted an MChem project advert to see if any students were interested in researching it with me. It is important to note that there is no scope to change the algorithm from an unweighted first year under the University's existing regulations; this project was never intended to inform any specific changes to the course.

I did badly in my own first year, and was initially resistant to the idea of weighting it for my students. After meeting students who were struggling in later years because of low engagement with first year, though, I have started to wonder if there is an education-welfare case for nonzero weighting in some cohorts.

EDUCATIONAL CONTEXT

The dominant model for classifying degrees in the UK involves sorting candidates into 'classes' of award. Typically, candidates scoring above 70% are awarded 'first' degrees, with lower scores being associated with (in descending 10% increments) 'two:one', 'two:two', and 'third' classes.

The variation in classification algorithms across the UK HE sector is wide: 15% of students would receive a different degree classification if their raw marks were processed by a different algorithm (Yorke et al., 2004). This ignores borderline algorithms, which further complicate matters (*Understanding Degree Algorithms*, 2017).

Critiques of degree classification algorithms have been concerned largely with 'grade inflation': the argument is that growing numbers of 'good' degrees 'devalues' their 'worth'. This seems to principally concern employers: the class of degree is a convenient way to coarsely sort applicant quality, and the growing proportion of 'good' degrees is making this problematic (Johnes & Soo, 2017).

There are, though, other stakeholders in the discussion of the algorithm. Students are affected personally by the way their result is calculated, and institutions awarding degrees are affected reputationally by the proportion of good degrees they award (Bachan, 2017).

Different algorithms reflect different approaches to navigating the tensions between stakeholders, evidencing *profoundly* different understandings of what a degree is: an education, a certification of performance, or an indication of future potential. For example, greater weighting on later years is often justified in an 'exit velocity' argument: a student's performance in their final year is a better indication of graduate ability than performance in their first year. Tempering this is a recognition that late, high-stakes assessment can negatively affect both student wellbeing and attainment. 100% weighting in the third year is therefore very rare.

Articulating what it means for something to 'count' is surprisingly involved. Even when the marks are not weighted in the classification algorithm, it is standard practice to require students to pass a certain number of credits to graduate, or progress onto the next year of their course. Similarly, failing a small number of credits is normally tolerated within an algorithm. We use the term 'count' to mean 'have the numerical mark contribute to the classification of a graduate's degree'. We feel that this aligns well with the student-as-consumer literature (see Bunce et al., 2016) and our research findings.

Surveying the 55 BSc Chemistry programmes in the UK which publicly listed their degree algorithms, 47 (85%) adopt a zero weighting for Level 4 (all HEIs in Scotland had a zero weighting for Levels 3 and 4). Cambridge alone does not classify degrees, and 7 (13%) of institutions had a non-zero weighting. This was either 10% or one-ninth (11.1%). A small weighting for Chemistry's first year seems, therefore, to be a credible (but minority) approach.

Until the mid-2000s, the first year of Hull's Chemistry programme was weighted at 10% in the classification algorithm. Currently, the first year has a zero weighting.

Arriving as a new academic in 2016, MO noticed that there was a significant staff appetite for returning to a 10% weighting to support student motivation. Curious, he started to formally articulate some of the decision-making framework for choosing the first year weighting in the classification algorithm (O'Neill, 2018) and offered an MChem (Level 7, 60 credits) project investigating this in 2017-18.

JW selected the project, was assigned it (by a third party), and wrote a literature review of the field in autumn 2017. Supported throughout by MO, he then designed and executed an investigation into students' views on first-year weighting. The study was given ethical clearance by the School of Mathematics and Physical Sciences Ethics Committee in line with University and Faculty guidelines.

JW: On reviewing the literature the gap in both First Year and Chemistry specific papers was obvious but to be expected, however somewhat surprisingly I noticed that the publication of the student voice (or student voices) was lacking. Alongside the lack of views and voices, was very limited publication of real qualitative and quantitative data collected from students themselves. Noticing this, the tone and direction for the project was set.

In the end, ensuring that students' voices were properly included and listened to was my primary aim with the project. I feel there is a systemic problem in HEIs of 'cherry picking' the students they listen to, or just ignoring students altogether. Whilst I accept that students cannot and do not fully grasp the nuances of such a pedagogically complex problem, disregarding their voices seem like a huge oversight.

MO: It is odd that first year weighting is under-researched, because there has been sustained research interest in the transition into HE. I worry that the linearity of Chemistry is not fully recognised in many algorithms; first year seems unusually important in a discipline which requires retention of detailed content knowledge before progressing to higher-order Problem Solving in later years. JW's observation that the Student Voice was also under-researched is something I had completely missed; it has led to a much more interesting project.

METHODOLOGY

JW designed a 'mixed methods' study to listen to the Student Voice on the issue of first-year weighting. This was informed by a grounding in the expectancy-value and intrinsic-extrinsic models of motivation, and also JW's employment in the University of Hull's Widening Participation Office alongside his studies. MO supported JW throughout, aiming to enable JW's chosen direction in the context of good research practice.

JW's identity in this study is important. As a researcher, he aimed to produce high-quality research output. This supports a well-informed, critical, research-led approach to the research question. However, he has a second identity: as a student, he occupies the same social space as his research participants (and holds personal views on the way his degree classification is calculated).

JW: Being a student certainly helped I think, if only to leverage peers to complete the survey. For transparency, my own degree outcome would be best served by heavily weighting Year 1.

The complementary position of MO is also somewhat curious, and potentially problematic. His primary goal was to support JW's education by scaffolding a rigorous and critical research project. One can imagine a situation in which MO's view on some algorithm would unduly pressure JW to adopt a particular view. In practice this was not an issue; disagreements were frequent, often significant, and always navigated in good humour with a shared commitment to both the evidence and JW's education.

MO: JW seemed extremely comfortable disagreeing with me, which is something I worried about beforehand. Reasoned discussion of disagreements actually often led me to change my view. For example, JW did not ask for survey participants' gender, which surprised me. He argued that there was no reason to suspect that gender would influence views on algorithms. The right choice was therefore to exclude the item from the survey in order to reduce the ethical risk of identification in a (necessarily modestly-sized) pilot project. The clear focus on the flow of evidence and argument feels like the heart of what HE should be about; I found this teaching extremely rewarding.

The focus on developing JW's research skills probably slowed the course of research, though: if I had just wanted lots of results, I would have got more out of JW by providing him with research instruments 'off the shelf'. I'm glad I didn't do this: his focus on the Student Voice was a really thrilling addition to the project.

An electronic survey containing both Likert and Free-text items was distributed to all 393 undergraduate Chemistry and Biochemistry students at Hull in spring 2018, with follow-up focus groups. 62 survey responses (15.8% response rate) provided a rich data set, albeit a slightly small one. The focus group (planned as a deep discussion with 12 participants) was only attended by 4 students. The response rate was similar to other (non-NSS) surveys run at the institution, but presents an interesting point for reflection in a student-as-partner context. Seale *et al.* (2014) emphasise that student silence can be an active decision, or reflect satisfaction with the *status quo*. We have opted to present our respondents' data transparently and take no view on interpreting the response rate.

RESULTS AND DISCUSSION

The survey was broadly representative of the cohort, save that a) zero (of 3) students in the Foundation Year responded; and b) only two (of 38) biochemists responded.

In a binary choice, students were asked whether the current system of zero-weighting was a 'good idea'. 40% of participants (25) indicated 'yes', 60% (37) 'no'.

Free-text elaboration from those favouring the current zero weighting illustrated rationales centring on 'transition year' arguments, as well as discussion about ensuring that all students had the same standard of knowledge. Those disagreeing with the zero weighting raised a wider range of points: value for money; improving motivation; and reducing weighting strain on later years.

Breaking down the views on the current zero-weighting for first year by the year of study proved fascinating (Figure 1).

Is an Unweighted Year 1 a Good Idea?
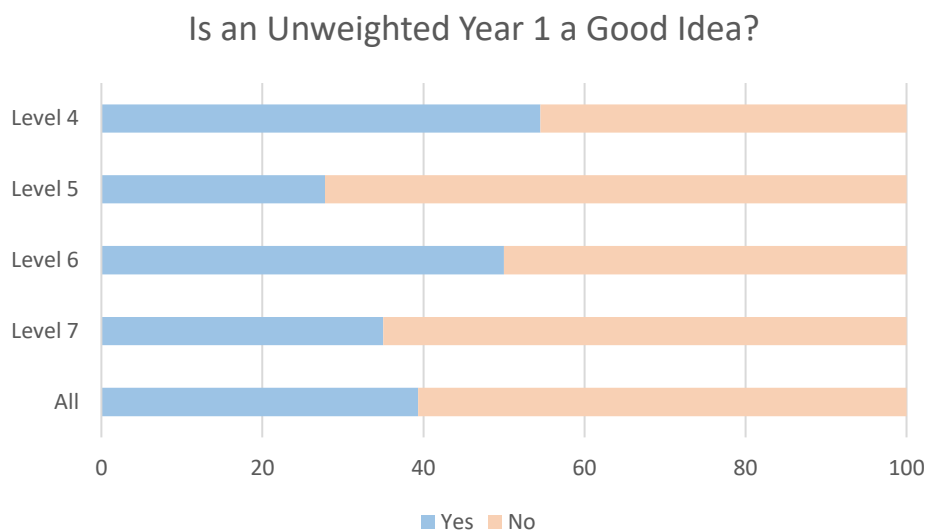
Figure 1: Student views on a 0% first-year weighting in undergraduate Chemistry programmes at the University of Hull, stratified by level of study.

Stratification by Level of study was probably the most interesting finding of this project. First year students are the only category of student with a modal (55%) endorsement of an unweighted first year, yet only 28% of the second year respondents thought the zero weighting was a good idea. Such a dramatic swing between year groups is evidence of a student voice fragmented even among adjacent cohorts.

Free-text responses on students' preferred first year weighting were often very coherent:

> *10%, it is about everyone getting up to the same level but the zero weighting is not an incentive to do so, it is an incentive to waste a year scraping by with bare minimum pass marks whilst going off and partying every night. Plus it is unfair to have a whole year cost £9000 (the same as later years) but not actually get anything out of it.*

> *As starting university is different from studying at a sixth form or college, I think that Year 1 should not count but still be examined to allow students to become accustomed to university life.*

> *I think it is fine being unweighted as it gives students time to become accustomed to the work and topics involved, without the added pressure of results going towards the degree.*

Stratification by student characteristics (Figure 2) also proved interesting. Students working towards degrees involving a Year in Industry were the group least enamoured with the zero-weighted first year, with only 29% endorsing it as 'a good idea'.

Is an Unweighted Year 1 a Good Idea?
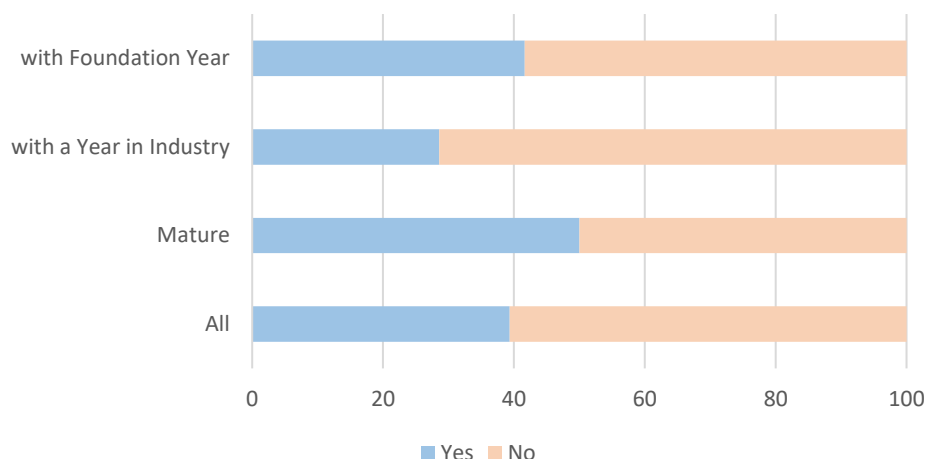
Figure 2: Student views on a 0% first-year weighting in undergraduate Chemistry programmes at the University of Hull, stratified by various student characteristics (degree programme including a Foundation Year or Year in Industry, and self-identification as a 'mature' student).

Importantly, students on 'Year in Industry' courses are required to get good scores in first year to remain on the programme. Their pronounced dissatisfaction with the zero weighting might reflect a 'reward' conception of the algorithm:

> *…as I wanted to do a placement year, I already knew I had to work hard to obtain grades suitable for the placement year. As I worked so hard in my first year, I am a bit upset that my grade for the first year is not counted in my overall grade.*

The survey probed the tension between motivation and pressure through two free-text items: *If Year 1 had been weighted when you sat it, do you think it would have encouraged you to work harder at all?* and *If Year 1 had been weighted when you sat it, do you think that it would have made your transition to university harder?* Simple yes/no coding of the participants' responses revealed the modal student intersection: a weighted first year would have encouraged them to work harder without making the transition to University harder (Figure 3).

A weighted first year…
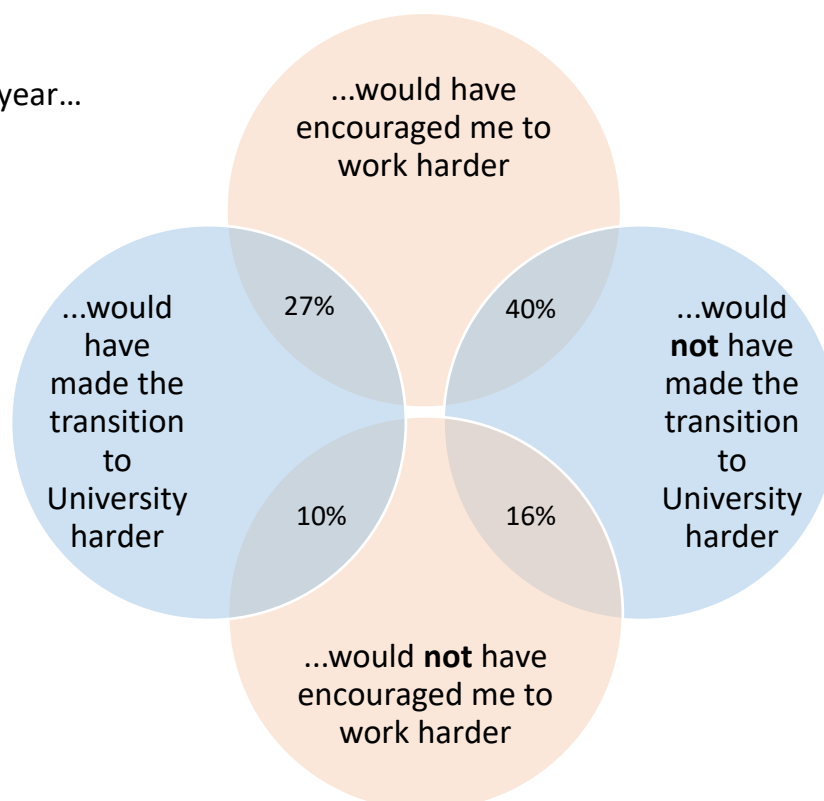
Figure 3: A Venn-like diagram showing the coded % of respondents on their views about the effect that a weighted first year might have had on their work (peach) and their transition to University (blue). Note that 4 of the 62 responses (6%) could not be yes/no coded.

The free-text responses to the question: '*if Year 1 had been weighted when you sat it, do you think that it would have made your transition to university harder?*' were particularly interesting.

> *Yes as I needed the practice from the transition from A level to university*

> *No, A-levels were assessed and Y1 should be too.*

> *Yes- it was good adjusting to university life and a new way of living over a longer period of time.*

> *No. I actually think I lost momentum between college and 2nd year because there was no incentive for working harder.*

MO: Without the detailed focus afforded by JW's MChem project, I don't know how we would have uncovered this variation in students' views on the L4 weighting. I keep wondering how these findings might have influenced policy making when the University adopted a blanket zero weighting across all courses, and whether systematically investigating student views on pedagogic policy 'on demand' would be feasible in a sustainable University workflow.

DISAPPOINTMENTS AS PARTNERS

A focus group was designed with great care to probe the relationship between stress and motivation in different weighting models. Unfortunately, the scheduled time proved to be extraordinarily sunny, which might have been a factor behind the low attendance rate (4 of 12).

The results, however thoroughly derived, were hard to rely upon in light of the sample size. This was disappointing, as it restricted the scope for a rounded 'mixed methods' study and denied thorough analysis of tantalising results.

In some ways, the disappointment was easy to navigate: JW's task was to write a project report describing his work and findings. The assessment rubrics are sympathetic to coherent analysis of 'failed' experiments, and the focus group attendance did not prevent him from writing a strong piece.

On the other hand, the research output was weakened by the low attendance. Given the timing of the research in the context of the deadline for JW's project submission, rescheduling the focus group was not possible.

This situation drew out a tension between the identity of JW as a student and JW as a partner-researcher. As a student, the 'right move' after the low Focus Group attendance was to stop researching and start writing. As a researcher, this course of action precluded further investigation.

JW: It would have been easy to allow the low focus group attendance to derail the project whilst I sat feeling sorry for myself. Whilst a larger dataset would have been nice, the suggestions made by the attendees provided some interesting discussion points. From the (limited) responses, the 'extra credit' year seems to be an item worthy of further investigation.
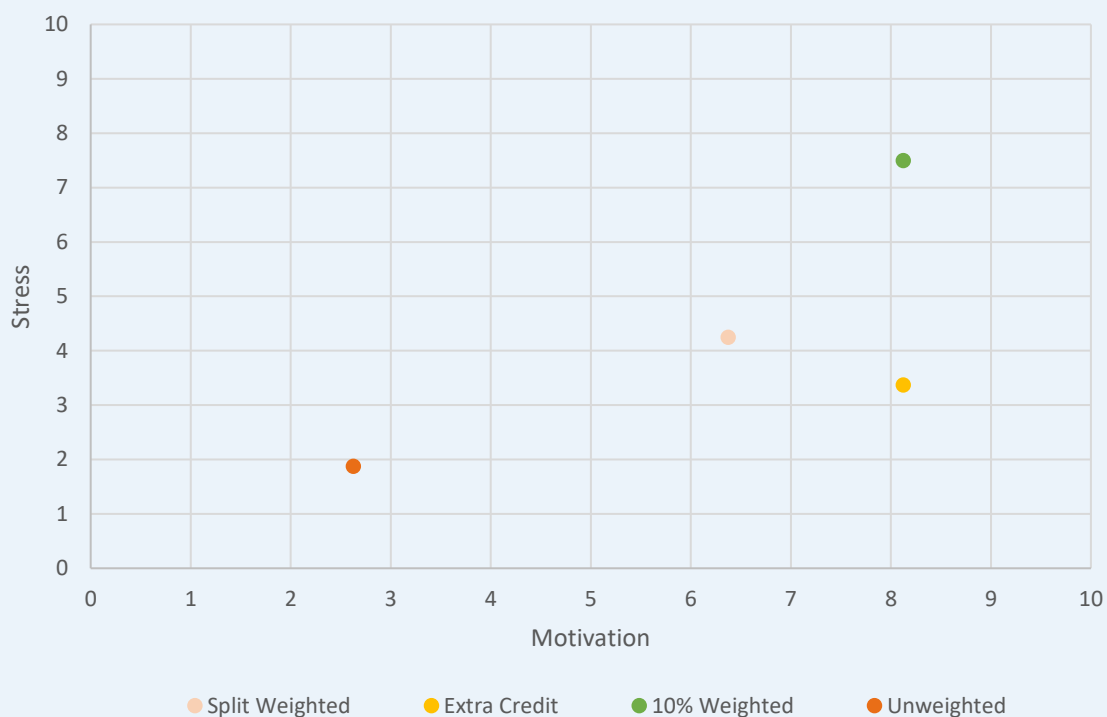
Figure 4: Linearly-averaged responses from Focus Group participants when asked (individually and without consultation) to plot Motivation vs Stress for various approaches to First Year Weighting. 'Split Weighted' would involve a 0% weighting for Semester 1 modules and a 5% weighting for Semester 2 modules. 'Extra Credit' would involve first year performances above a certain threshold (e.g. 55%) contributing bonus marks to a student's end-of-degree score (e.g. 0.5% for a first year score of 55% scaling to 2% for a score of 70%).

This data is far from conclusive, but the extra credit point stands out. Had time allowed it, it would have been great to have run a second focus group, specifically looking at these alternatives. Certainly, the extra credit year is a novel idea, worthy of discussion. It would be interesting to investigate it in the context of grade inflation, to see how both students and staff thought it fit with the current discourse.

The experience of designing and running a focus group in of itself was one of the most rewarding and educationally valuable aspects of my project, and perhaps dealing with and navigating the below-ideal attendance has been more useful than if it had all gone to plan.

RESEARCH CONCLUSIONS

There is significant student dissatisfaction with Hull's current practice of an unweighted first year for Chemistry degrees: 60% of students who responded to the survey do not think it is 'a good idea'. This pattern shifts interestingly between different types of student (e.g. students on 'Year in Industry' programmes seem keen on a weighted first year) and stage of study (with, broadly, students in later years favouring a weighted first year). The modal view from participants is that a weighted year would increase motivation without making the transition to University harder.

By empowering JW, the SAP approach directed this study to focus on the Student Voice, and also proved successful in gathering and analysing the findings. Navigating the inevitable setbacks of research in this context was challenging but achievable within a traditional assessed project framework.

Further work might touch on the discussion of an 'extra credit' model, which was viewed favourably by the small focus group. Extending the study to other disciplines, universities, and year weightings would provide fascinating comparisons with the work in this study; we can imagine different methodologies complementing or developing our SAP approach. Broadly, we have found the radical collegiality developed through a curricular student-as-partner pilot project to provide rich scope for reflection on a complex issue; we hope that this paper helps policy makers to recognise the pedagogic situation of classification algorithms in the 'grade inflation' debate.

REFLECTIVE CONCLUSIONS

JW: Moving away from the strict archaic bounds of a Staff-Student relationship had a hugely positive impact on the project in my opinion. Had the project involved MO dictating the work to me, my development and understanding of the area would have been restricted. Furthermore, the rich depth and quality of the work may also have been impacted. By allowing me the room to explore the topic and pursue avenues that interested me, MO allowed the project to breathe and come to life.

Whilst during the project I wouldn't necessarily have described myself as a 'partner' or 'collaborator', reflecting on the work it is clear to see that that was the case. I'm not sure this freedom to take ownership of the project would have worked with every student, but in this case it worked well. Moving forward there is still more work to be done on the project, and it would be interesting to see how a future student would handle this.
MO's supervision throughout was certainly notable in how much effort he was putting in compared to the apparent effort of my peers' supervisors. Had it not been for this diligent supervision, I wonder what would have come of the project.

Our differences of opinions have been touched on, but I think it's crucial to mention that I never felt as if MO was pushing an agenda. Allowing me to have meaningful control over the project let the partnership grow (and is perhaps the only way such a partnership can grow), and this goes back to the earlier point of allowing me to explore the project on my own terms.

MO: I offered MChem project titles which would allow me to access authentic student views through the use of student 'spies'. In cold, hard terms of output, JW has delivered some fascinating material which the staff-student power balance may have placed outside my reach. I hope that the relationship has not been mercenary, though: I have tried to support JW's academic development, encouraging him to take sincere ownership of the work.

For me, the focus of the project was always squarely on making sure JW produced a report that he could be proud of. This attitude was occasionally difficult to maintain when I had different methodological views to JW, and in the face of poor Focus Group attendance near the end of the semester. I was tempted to ask him to run more focus groups, but this seemed unjustifiable when prioritising his learning and assessment.

The supervision hours I spent on this were lavish (I estimate ~40h over the academic year), which I justified to myself by 'cross-subsidising' Teaching with the 'Scholarship' portion of my contract/workload. While this permitted more tailored support for JW, I felt greater pressure to make sure the project 'paid off'.

The low focus group attendance was particularly disappointing as it threatened the impact of the project; the survey data is robust, but a complementary focus group study would add weight to the findings. Discussing this disappointment with colleagues eventually cast the whole situation in a different light, helping me see that my experiences of supervising assessed SAP research at the programme level was itself worth sharing with the community. In writing this, I was interested to discover that JW viewed his exposure to research failure as educationally valuable.

This research was successfully reviewed at School level according to the University of Hull's research ethics committee guidelines.

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