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Customising Best Practice In Studies Advice For Undergraduate Engineering Students

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CUSTOMISING BEST PRACTICE IN STUDIES ADVICE FOR UNDERGRADUATE ENGINEERING STUDENTS (PRACTICE PAPER)

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ABSTRACT

The attrition rates from undergraduate engineering programmes in the UK remains stubbornly high, despite the best efforts of course teams to engage and support students on their learning journeys. It is generally accepted that there is no single reason for attrition rates from engineering programmes being higher than from other vocational-type university programmes, but many academics believe that an effective Studies Advice system that works for students and staff, could lead to reduced numbers of disengaging and/or failing students.

Much has been written on effective approaches to the provision of Studies Advice at University, but it is not clear if the implementation of discipline specific approaches would yield better outcomes.

This practice paper describes work that is currently underway at Ulster University to examine engineering students' perspectives on the Studies Advice approach and to explore how best practice in the university sector might be effectively customised for engineering students. The work describes an initial scoping study, a co-creation exercise with students to establish their baseline understanding of the current system and their 'wish-list', and a follow-up focus group session where a number of discipline-specific interventions were explored.

Preliminary findings indicate that professional support departments could be more effectively integrated with academic support to provide a wrap-around or 'single contact point' for Studies Advice, that formal organised studies advice sessions should be explicit on programme schedules and that an informal 'buddy or mentor' student-to-student support system would be beneficial in addressing the UK engineering student attrition issue.

1 INTRODUCTION

1.1 Background and context

Pre-university entry profiles for engineering students in many UK universities are diverse and include learners from both academic and vocational backgrounds. The entry points to engineering programmes may also vary due to foundation degree (Fd) programmes which articulate to engineering degree programmes. Whilst this is to be welcomed from a Widening Participation and an Equality, Diversity and Inclusion (EDI) perspective it poses engineering educators with a series of specific challenges that are a 'work-in-progress' within the engineering education community. Work continues to find effective ways, and establish best practice, to support these diverse learners achieve their full potential in an academically demanding subject area.

Data from the Higher Education Statistics Agency (HESA) shows that whilst the 2019-20 non-continuation rate for engineering and technology of 5.3% is at its lowest level in the recent past, and is on a downward trend, it remains stubbornly high when

compared to other vocational-type university programmes that underpin professional registration such as law, medicine/dentistry/veterinary sciences or 'subjects allied to medicine'. The HESA data also identifies that of those engineering and technology students who dropped-out of their HE courses, the most 'at-risk-of-drop-out' students were those who had pre-entry qualifications of 'Level 3 + an equivalent A level' closely followed by those students who had taken a BTEC qualification, with drop-out rates reported of 12.6% and 11.8% respectively for 2022. Much has been done to improve the attractiveness of engineering and to encourage schoolchildren pursue the STEM subjects; alternative pathways into the profession such as BTECs or T levels, etc. have been developed, but there is much work still to be done for educators to successfully retain and progress students in sufficient numbers through to completion of their engineering programmes and beyond.

It's clear that the UK's Higher Education (HE) landscape for engineering is in a state of flux. The re-energised UK government focus on degree apprenticeships, the challenges industry faces recruiting sufficient numbers of high calibre graduate engineers, and a post-Covid student community who have not had the usual social, societal and developmental school experiences pre-university.

This practice paper examines best practice in studies advice for university students and proposes a practical, discipline-specific, 'pick-n-mix' or customised approach for undergraduate engineering students that will be relatively straightforward to administer and which, it is hoped, will better engage engineering students in their own learning journeys through the provision of timely and self-selected interventions.

1.2 Literature Review

It is broadly accepted that there is no single reason for non-continuation or attrition rates from engineering programmes being higher than from other vocational-type university programmes, but many academics believe that an effective studies advice system that works for students *and staff* could lead to reduced numbers of disengaging and/or failing students (Zepke & Leach 2005).

In general, academics relish their Studies Advisor role and enjoy that people-centred aspect of their academic role, despite the obvious time commitments such a role represents, given the large cohort sizes that are commonplace in today's universities (Johnson 2016). Effective approaches to the provision of Studies Advice at University have been described previously but it is not clear if discipline specific approaches, tailored for given cohorts, would yield better outcomes. (Rolfe 2002) notes students from a vocational background are less willing to undertake independent study and demand more time and support from lecturers. Variability in the level of support expected and/or required by a diverse student cohort may not be obvious or easily recognised by academics and there are multiple points of failure in such a system.

(Cahill et al. 2014) indicate that student expectations and the nature of student support changes as students' progress through their programme of study.

While approaches to the delivery of studies advice varies significantly between institutions (Habley, 1997) it is recognised broadly that advising / tutoring has both academic and non-academic aspects and supports students achieve "their academic and personal aspirations". Four components of the UK Professional Framework for Advising and Tutoring (UKAT) shown in Figure 1 are described as Conceptual, Informational, Relational and Professional.



Fig. 1. (UKAT 2023) The Professional Framework for Advising and Tutoring Studies advisors, it's argued, should have the appropriate knowledge and skills to support student learning and personal development at university and their professionalism or 'understanding' within the tutor-tutee space should enable them to connect students 'deeply' to their studies *and* institution.

In practice, most students engage with advice when they need to understand University policies, structures and procedures in making decisions (Kramer 2003) but it can also include students' aspirations and fulfilment (O'Banion 2009) as well as their wellbeing (Kramer 2003).

Engagement with advice is variable and is based on the needs of individual students (UKAT 2021) and the nature of student support that the students expects will change as student progresses through their programme of study, (Cahill et al. 2014).

One of the core categories in the UK National Student Survey (NSS) is Academic Support. The NSS is taken by students in the final year of their studies at all UK universities, and is an important external metric for universities, parents and prospective students. Despite Ulster University having a broadly uniform approach to Studies Advice, NSS results by programme are variable, once again indicating that students' perceptions are non-uniform even within a School. There are three questions that are asked under the Academic Support heading namely:

1. I have been able to contact staff when I needed to.
2. I have received sufficient advice and guidance in relation to my course.
3. Good advice was available when I needed to make study choices on my course.

In summary, there is much good practice in the sector and the challenge is how course teams can adapt that good practice and flex it to suit a local context and institutional preferences.

2 METHODOLOGY

2.1 Co-creation event

A sample (n=14) drawn from undergraduate engineering students in the School of Engineering and the Belfast School of Art and the Built Environment were invited to a co-creation event where;

1. their understanding of Ulster's current Studies Advice system
2. their perceptions of the effectiveness of Ulster's system and
3. their 'wish list' for an 'ideal' system

could be explored. Chatham House Rules was made explicit at the start of the session and students were arranged in groups of 3 or 4, and the sequencing of questions posed followed Kreuger's categories, (Kreuger, 1998).

The opening question for the co-creation required students to reflect on their experience of current studies advice in Ulster. This was followed by an introductory question on what works well and what works not so well in the current studies advice system. The key questions invited students to generate and share ideas on what an ideal studies advice system would be and how course teams might raise student aspirations and overall engagement within the undergraduate engineering student community. The ending questions closed with an opportunity for students to propose what makes a full and enjoyable student experience.

Kreuger's categories	Questions
Opening question	What experiences have you had of studies advice?
Introductory question	What works well in the current studies advice system?
Transition question	What works not so well in the current studies advice system?
Key questions	What would you like from an ideal studies advice system? How can we raise student aspirations and overall engagement?
Ending question	What can make a full and enjoyable student experience?

A basic content analysis of the students' views from the co-creation event, revealed three broad categories of views that we have termed; Academic, Operational and Guidance.

Interpreting and understanding the various studies advice category responses and the activities that the University might provide to support them were then explored in more detail, and students' understanding was checked in the follow-up focus group session.

2.2 Focus group

The focus group session was used to test students' perceptions on specific interventions that Ulster University could support, based on its current provision. Specific questions on the logistics of;

1. how the Schools could implement a user-friendly, low-overhead and practical approach, that would require students to select from a pre-set menu of possible interventions within each broad Studies Advice category, and
2. how those students' preferences could be streamlined and organised for each year 2 student on an undergraduate engineering programme.

In effect, how might we provide a customised studies advice experience for each student tailored to their specific needs.

3 FINDINGS

3.1 Understanding of current Studies Advice system and student ‘wish list’

Tables 1 and 2 show students’ suggestions from the co-creation events. Ulster University has a weekly timetabled Studies Advice session integrated within a specific ‘Introduction to Engineering’ module for first year undergraduate engineering students. Table 1 shows that this regular ‘drip-feed’ approach is valued by students (despite all students not engaging positively with it) and feedback in the Focus group event shows that there’d be merit extending it to year 2 students, particularly insofar as for widening access universities, such as Ulster, there are lots of ‘new’ students who join year 2 having previously completed a Foundation programme elsewhere. It’s also noted that the performance of students in year 2, the so-called sophomores, tends to dip (as is the case more broadly), so improvements in the efficacy of the studies advice system would be welcome. The challenge is to encourage students to take charge of their own learning and personal development needs, recognise and accept that both developmental aspects are important, and be proactive in identifying and engaging with enhancement opportunities that are available to them.

Table 1. Operational wish-list

Operational - structure and scheduling of meetings		
Format preference	Frequency preference	Planning & scheduling
1-2-1	Week 1, 6 and 12 is ideal	Personally timetabled and personal/one-on-one support available on demand
Happy with online or in person	Year 1 Semester 1 weekly meetings and review helpful	Must be clearly communicated, studies advisors should be seen as available to students – currently students feel that they need to search a lot for help and often turn to peers for advice.
F2F preferable for many		Reminders sent for studies advice meetings

Table 2 shows the Academic support and Guidance that students would like from any studies advice system.

Table 2. Academic support and Guidance ‘wish-list’ from Studies Advice system

Academic support			Guidance		
Progression	Support	Skills development	Employability	Extra and co-curricular activities	Financial advice
Personal feedback on academic progress	Dealing with students who need learning support	Advice of how to study effectively	Provide support and advice on joining professional institutions	Focus on student experience, transition to university life	Advice on student finance options
Visibility and understanding of learning outcomes to aid progression	Understanding University regulations for my course	More early warning systems for coursework deadlines	Guidance on placement opportunities	Societies, Clubs, study trips abroad	Advice on grants and hardship fund availability
Enable students to consider research and development opportunities	Helping students who are struggling to pass modules	Improved social experience through study groups/ Student mentor system	Awards for hard work and to boost CV’s welcome. Edge award/Global Engineer	Student jobs guidance	Signposts to scholarship opportunities

We have grouped students' responses relating to personal development opportunities under the 'Guidance' category and it's clear that students are indeed invested in seeking out extra- and co-curricular activities but anecdotally, uptake of these opportunities by engineering students lags behind students in other disciplines. Our preliminary findings support the argument that a studies advice system which is tailored to the needs of the student will encourage and empower students to take ownership of their learning (and by extension, embed a culture of lifelong learning) and to engage with those support systems that they believe will be of use to them.

3.2 Logistics of proposed customised Studies Advice system

It is proposed that the School develops an MS Forms questionnaire in line with EDI best practice on inclusivity. Studies advisors will administer the questionnaire to their year 2 students to complete in the first few weeks of the academic year. A series of questions using closed and open responses could be used to:

1. prompt students to reflect on their academic performance in the previous year of their course, and
2. identify areas that they'd like to see specifically focus on for development during year 2, and
3. prepare an enhancement plan from both an academic and personal development perspective.

A series of drop-down menus could be pre-populated with discipline-specific interventions, such as, Maths coaching, Studiocity, Library skills, SolidEdge skills, Matlab, etc. (ie areas that the Focus group identified as being useful) that are clickable so that students can select those activities that they have identified for enhancement. The School can then collate responses from all the year 2 programmes, organise and timetable activities centrally so that each student knows where/when to attend their selected enhancement activity, whether that be discipline-specific support or personal development activities. The 1-2-1 tutor-tutee meeting can be much more clearly focused on the extent of the student's achievement or on plans to overcome obstacles that may have arisen for any given student. It is expected that when students can see and recognise the 'value' in the studies advice meetings (which is enhanced by the student's preparation and reflection) they should be motivated to engage more fully with the session. The proposed approach will have the effect of educating students (and staff) as to what's available for them (and how to navigate the professional support departments eg student wellbeing, student fees, employability, global engagement, etc.) and importantly, affording them the opportunity early in a semester to 'opt-in' and own **their** Studies Advice system and then attend those scheduled sessions that they have personally selected.

A working title for the new customised studies advice system is Academic and Personal Development Plan (APDP) but a more catchy acronym that includes 'Engineering' would facilitate staff and students buy-in and help embed the approach.

It is recognised that the questionnaire to be used will likely require ethical approval and this will be sought from the Faculty's Research Ethics Filter Committee. Ulster University has a institutional Strategy for Learning and Teaching Enhancement known as SLaTE and the project team plan to submit a funding application to support this work in the next academic year.

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