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Trailing or Failing? A Hidden Mental Health Issue: The Changing Futures Project

1. ABSTRACT

The 'Changing Futures Project' aimed to directly tackle an issue that has been long reported in both academic and professional body spheres, that of student failure in engineering education[1,2]. It focused on the experiences of 96 Engineering & Applied Science students who were classified as 'failing' or 'trailing' in one or more modules. One of the unforeseen outcomes of the project was the high numbers of students who reported that they had been experiencing mental health problems at the time when they found themselves failing. By putting in a series of academic and individual support interventions, including referring students to the relevant counselling and medical support services, the project proved to be a great success, with all but three students within the original sample progressing to the next level of their academic journey.

Key words: Mental Health: Failing Students: Study Support

1. Introduction

The massification and marketization of Higher Education in the UK, Europe and elsewhere over the past two to three decades has seen increased numbers of students entering Higher Education. This in itself has inevitably led to a somewhat intransient problem; that of high levels of 'attrition' with increasing numbers of Engineering and Applied Sciences students failing to complete their studies. Whilst data relating to attrition is somewhat patchy, figures produced by the European Commission (2013) focused on completion rates suggest the UK is quite well placed when compared to other EU countries, with 82% of students completing their degree. The country with the highest completion rate is Denmark with 85%; whilst in the Netherlands the figure is 72% and in Norway it is 59%. The highest reported attrition rates in Europe are found in Sweden and Hungary where only 53% of students complete their course. Conversely, of the 27 countries which formed part of the EU in 2013, data pertaining to how many students completed Higher Education is only available from 8 countries. With some notable omissions from the likes of Germany, Spain and Switzerland as well as many of the Eastern European countries [3]. In the USA the situation is equally problematic, where only 42.1% of students are known to have graduated from their original programme after a six year period; although 13% of students in the USA go on to complete their studies elsewhere (making the completion rate of 55.1%, comparable to the those countries at the lower end of the scale in Europe)[4].

Whilst the attrition rate across Higher Education as a whole is problematic, the percentage of students 'dropping out' of Engineering Programmes in the UK is a matter of particular concern, something that has been discussed at some length by government, academia and professional bodies alike[5,6,7,8,9]. In the case-study organisation, Gosta University, the attrition rate is around 6%[10]. Whilst this may not seem particularly high, the driving factor behind the development of the Changing Futures Project was the fact that for those students who do drop out of university, the impact on their lives and futures can be significant.

2. Background

2.1 Retention & Success

The question of 'what works?' forms the basis of much discussion within the UK Higher Education Sector where literature on 'retention and success' gives an insight into the somewhat debated social, educational and economic factors underpinning student attrition [11,12,13,14]. The most frequently expressed explanations as to why students fail to complete their degree reflect the complexity of the issues and vary in nature from a lack of 'engagement with studies' through to the impact that institutional culture can have on learning [15,16,17].

In considering the issues faced by students enrolled on undergraduate level engineering & applied science programmes one of the key debates about how students experience Higher Education centres upon the teaching of science at High School; with a significant body of literature suggesting that weaknesses in the secondary school science curriculum represent a key determinant of low performance at university [18,19,20]. Other debates focus upon the effect that demographic variables such as gender and ethnicity have on student outcomes [21,22], with shortages of appropriate role-models being one of the many somewhat intangible variables impacting the student experience. Whilst factors relating to student attrition in engineering & applied science are debated within the literature [23,24] studies which suggest that '*Active Learning'* has a positive impact on the student experience within the engineering field are perhaps the most optimistic; with evidence suggesting that hands-on, relevant active learning experiences can do much to promote a positive student experience [25,26].

2.1 The Case Study Organisation

Gosta University is located in the central region of the United Kingdom. A university since the 1960's, Gosta is one of the UK's most diverse universities, with over 60% of its student population originating from Black and Minority Ethnic (BME) backgrounds. In terms of 'added value' and the promotion of social mobility, the University leads the UK, producing highly skilled, employable graduates many of whom go on to have professional careers. The *Changing Futures Project* was conducted in the University's School of Engineering & Applied Science. The School has around 2,500 students studying on a range of different undergraduate and postgraduate Engineering & Applied Science Programmes in 6 different 'discipline areas' including: Mechanical Engineering & Design: Computing Sciences: Chemical Engineering & Chemistry: Information Engineering & Maths: Electronic, Electrical Engineering & Physics: Engineering Systems and Engineer Management.

Despite the breadth of literature and debate, the question of ***why*** engineering students are more likely to fail and drop out of university than any other students remains unsolved. Previous studies into this issue have focused mainly at an institutional or national level and in the UK significant amounts of money has been spent on trying to provide a 'quick fix' for the problems at a strategic level. Despite such resources, very little empirical investigation into individual student's perspectives and experiences has been conducted. In seeking to understand the perceptions and experiences of individual students the Changing Futures Project took a different stance, developing bespoke pathways to promote success at the individual level. Based upon an Action Research approach the project is now in the early stages its second research cycle. The findings from the first stage have been evaluated and critiqued and form the basis of this paper.

By critiquing the 'student perspective' of failure at undergraduate level engineering education, and by proposing a number of solutions, this paper makes a notable contribution to current knowledge. In doing so it adds to current academic and policy debates.

3. Methodology

3.1 Project Rationale

Whilst the attrition rate at Gosta University is relatively low compared to other UK Higher Education Institutions, the fact that for each student who "drops out" the University loses a potential income of between £9,000 and £15,000 a year represents a key institutional driver for the *Changing Futures Project*. However, for the two project leaders, the impact that attrition has on individual students' lives and futures is a far more important matter. Both take a keen interest in individual student success, sharing a professional belief that Higher Education is key to social mobility. Indeed, for the majority of Gosta students, graduation represents a *ticket* out of relative poverty. Most students are 'first generation' attenders, getting a place at a good university can mean an end to transgenerational under-employment or economic activity. For the two project leaders this project represents an opportunity to make a long-lasting and positive difference to individual student's study and life-chances.

3.2 Key Concepts

Having agreed that the project should go ahead, the first step was to conceptualise what was meant by the term 'at risk' student. In an institution where the majority of students are classified as being from a 'non-traditional' background, with most being from working class backgrounds and the vast majority classified as BME (Black & Minority Ethnic) it was not feasible to look at social or demographic variables in terms of articulating risk. Instead the decision was taken to focus on academic achievement.

The award of Bachelor's Degrees in the UK is usually based upon a credit system whereby students are required to achieved 120 credits in each of the first, second and final years of study. At Gosta University a further 120 credits may be achieved by taking an 'integrated work placement' (paid or unpaid internship) and Bachelors' Degrees are scored using a system whereby those with an average of over 70% achieve a 'First Class' Honours Degree. Those scoring between 60-69% are awarded an 'Upper Second' (2.1), whilst those who achieve between 50-59% are awarded a 'Lower Second' (2.2). Students who achieve between 40-49% are awarded a 'Third Class' Honours Degree. The University regulations stipulate that the grade average is worked out based on 'first attempt' marks. Students have one opportunity to pass a module without any penalty. Following this, two further attempts are allowed but the grade capped at 40%. Students who fail on a third occasion are placed in jeopardy. Such students either continue on the 'Ordinary' or 'Diploma' Tracks (depending on how many credits they have) or are asked to leave without any recognition of their studies whatsoever.

Once a student fails a single module it is inevitable that their overall grade average drops. Drawing upon their own experience, the project leaders were aware that a single failed module is often accompanied by a drop in motivation, which in turn can quickly lead to more failure. Hence, it was decided that the term 'students at risk of attrition' would be conceptualised as including those students who, at the time of the project, had failed at least one module. Utilising data-analytics, a large data-trawling exercise was undertaken in which individual students who fitted this definition were identified.

3.3 Project Aim & Objectives

The underlying aim of the project was:

> "To directly tackle the issue of attrition and student failure in engineering and applied science at Gosta University".

A number of objectives were then articulated:

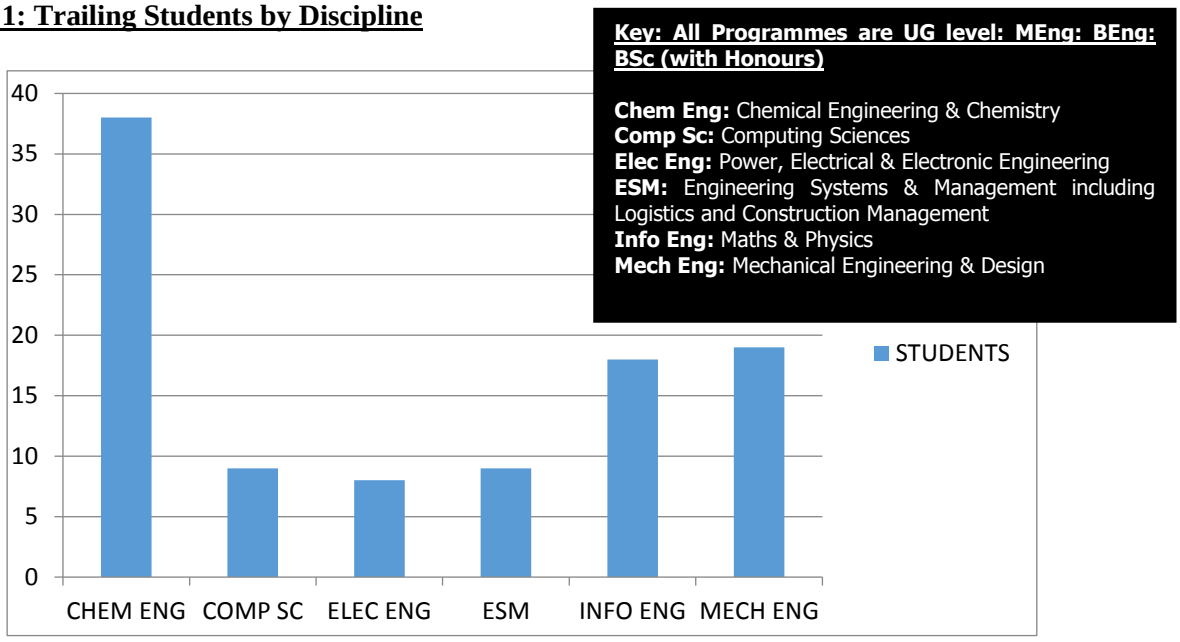
- Using data-analytics, identify students at risk of attrition.
- Investigate students' perceptions of the reasons behind their failure.
- Identify modules with high levels of student failure
- Develop cost-effective and academically appropriate interventions to support failing students
- Work with individual 'at risk' students to identify bespoke 'study pathways' with the aim of engendering success.
- Work with individual 'at risk' students to identify and, where necessary make referrals to appropriate counselling, medical, financial or other support services both within the university and externally.

3.4 The Sample

In total, the sampling field comprised the School undergraduate population of 1368 students. A total of 96 individuals (7% of the sampling field) were identified as being 'at risk' and thus formed the sample. With regards to gender, 77 of the sample were male and 19 female. Seventy-three of the students were from BME backgrounds.

Figure 1, below provides a breakdown of the subject-groups in which the 'at risk' students were studying

Figure 1: Trailing Students by Discipline



3.5 Working with the Data: Disaggregation & Analysis

The validity of the data was verified through a somewhat laborious process of disaggregation in which students' records were cross tabulated and examined on an individual basis. This process, which was extremely time consuming, enabled the researchers to confirm that all those within the sample had failed at least one module on one or more occasions and hence were correctly identified as 'at risk'.

In conducting a 'content analysis' of students' records a note was made of the following:

- Relevant demographic information
- Which programme the student was enrolled on
- Which module(s) were being trailed
- Any recorded exceptional circumstances (such as illness or family bereavement)
- Physical or learning disabilities
- The student's personal tutor

Disaggregating the data down to the individual level and examining each record in turn allowed for anomalies in student records to be identified and corrected. It also allowed patterns of behaviour and achievement to be identified, both from an academic or 'subject' focus but also in considering student performance from year to year.

In looking at the student's individual records one of the key variables which cross-correlated with student success emerged as 'prior education'. Figure 2 shows that just under half of the students had completed a university based foundation programme prior to starting their undergraduate level studies. This is not surprising as around half of those recruited into the School originate from such programmes. The most surprising finding at this stage related to the five students who were identified as having high grades in maths, physics and / or chemistry. Such students are classified in the UK system as being 'high achievers'. That these students were 'at risk' of attrition was immediately earmarked to be a matter of some concern, reinforcing the need to find out *why* students believe they fail of significant importance.

Figure 2: Trailing Students Prior Education

ENTRANCE QUALIFICATIONS	*N*
University Based Foundation Programme	46
Traditional GCE 'A' Levels Grades B,C in Maths, Physics and / or Chemistry	29
Traditional GCE'A' Levels Grades 'A' / 'A*' in Maths, Physics and / or Chemistry (High Achievers)	5
Vocational Qualifications	12
College Based Access Course	3
Undergraduate Bachelor's Degree	1

Having completed the content analysis, the next stage of the project was to put in place a number of interventions and actions specifically aimed at supporting those students identified as being 'at risk' of failure. The next section discusses these interventions in some detail before the penultimate section looks at the project outcomes and next steps. The conclusion incorporates a set of recommendations for colleagues in similar situations wishing to improve their institutional attrition rates.

4. Interventions & Actions

4.1 The Resource Study Pack & Tutorial Support

An important part of the project was to put in place a number of bespoke learning and teaching resources. The most notable of these was a "Resource Study Pack" which the project leaders developed based upon the academic profile of the sample. Each Resource Study Pack, comprised a number of 'virtual' resources for maths, physics and chemistry; it also provided instructive guidance with regards to academic writing and referencing. A quiz on learning styles was included and students encouraged to find a way of learning which suited their particular style and personality. A number of 'referral points' were also included within the Resource Packs, providing students advice on how to access help and guidance with both study related issues and personal matters. The initial aim was to make the Resource Study Pack available only to those students identified as being 'at risk'. However, after the initial dissemination to the study sample, positive feedback led to the decision to make the Pack available across the School.

One important part of the data trawling exercise and content analysis was to identify personal tutors and link them with those tutees who were identified as being 'at risk'. The university system is such that personal tutors have access to all of the student data, but with up to 50 or 60 personal tutees per academic member of staff, it can be very difficult for colleagues to be aware of the academic profile of each student allocated to them. Thus, for many, an email request informing them of which of their tutees were at risk of failing provided a useful resource. All but three of the personal tutors took personal responsibility for contacting their own tutees having been informed of the situation. Those colleagues who were unable to do so were given additional help and one of the project leaders took responsibility for their students.

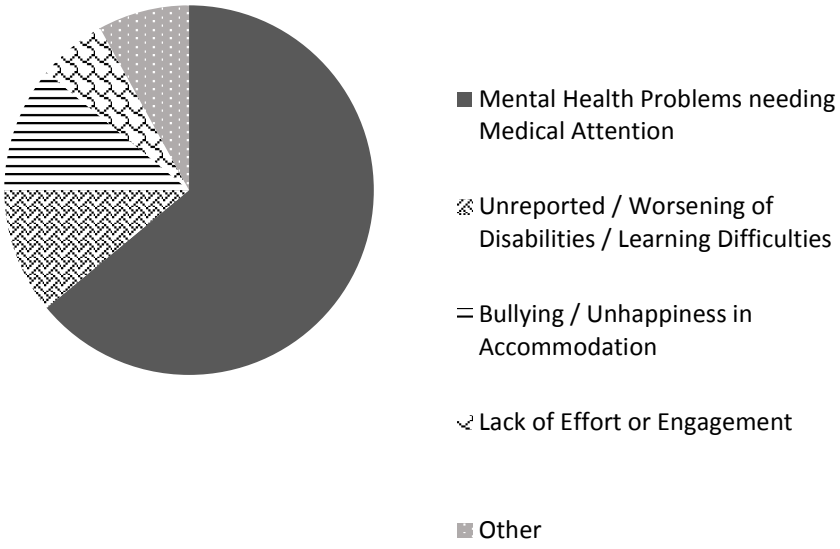
4.2 The Personal Touch

Having disseminated the Resource Study Pack, the next stage of the project was to make personal contact with all of those students identified as being 'at risk'. Hence, at the beginning of the second term individual emails were sent out to all of the 96 trailing students by one of the project leaders. Each student was informed that they had been identified as not reaching their potential and invited to attend a one-to-one 'support and development meeting'. Of the 96 contacted, 52 attended face-to-face or Skype meetings. The purpose of such meetings was to identify any extenuating circumstances that the University was unaware of and to work with the students on a one-to-one basis to develop 'Individual Study Pathways'. The meetings were not recorded in the same manner as they would be for more formal qualitative research but contemporaneous hand written notes were made in response to three key questions. These questions were:

- *How are you?*
- *What went wrong last year with regards to your studies?*
- *What can we do to help you get things back on track?*

During the course of the ensuing conversations the students were encouraged to discuss why they believed they had failed. Figure 2 gives an overview of their answers

Figure 3: Students' perceptions of the circumstances leading to failure



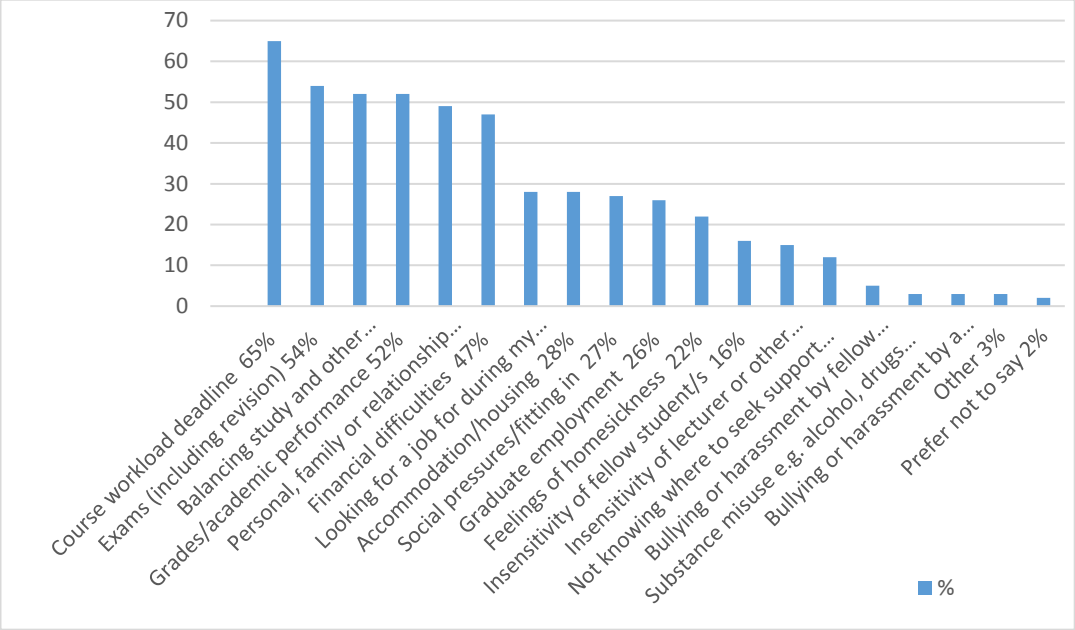
As soon as the individual interviews began concerns regarding mental health arose. Three students seen by the project leaders caused particular concern. One of these had not left his student accommodation for a week prior to receiving the invitation to meet with the project leader. An overseas student, it was quickly evident that this particular young man was experiencing a severe breakdown in his mental health. He was immediately dispatched to see a medic and a student counsellor saw him that day; the decision was made almost immediately to grant him a year long absence. His parents were contacted and plans made for him to fly home, which he did within three days of responding to the call to come in and talk about his problems. Another two British students, both from Asian communities were also experiencing acute mental health problems. Both had seen the campus medic or counselling services, but both were unwilling to talk to their families due to the stigma attached to such problems within British Asian (and wider British) culture. Additional support was put into place for such students who were also advised to take a leave of absence. Contact was maintained with the university by one of the project leaders who maintained contact with them until the following academic year.

The majority of students within the sample stated they had experienced some sort of mental health problem leading up to their experiencing difficulties with their studies. Whilst most of these had sought support from either the medical or counselling services, only five had informed the University of their situation and asked for consideration to be given under the auspices of the University's "Exceptional Circumstances Application Policy" [ECAP].

Such a lack of 'formal reporting' of mental health problems is not unusual. There is currently much discussion in the UK about mental health problems amongst the student population. A recent report by the National Union of Students suggests that 25% of students experience mental health problems whilst at university, although the vast majority of these do not report such problems to either their university or medical practitioners [27]. Investigating the underlying causes of such mental health problems was out

of project remit, as neither of the project leaders are mental health experts. Whilst they could provide 'pastoral' support and academic tutoring, in terms of supporting students struggling with mental health they could only refer individuals to the relevant support services. However, having identified that there was an issue, and in seeking to determine the likely causes of the issues a literature search was undertaken. This affirmed that the aetiology of mental health is both complex and multifaceted, with the most commonly cited 'mental health triggers' being deadlines and exams. Figure 4 provides an overview of the findings of a national survey conducted to examine this issue amongst the UK student population.

Figure 4: Reasons why students experience mental health problems (NUS, 2016) [27]

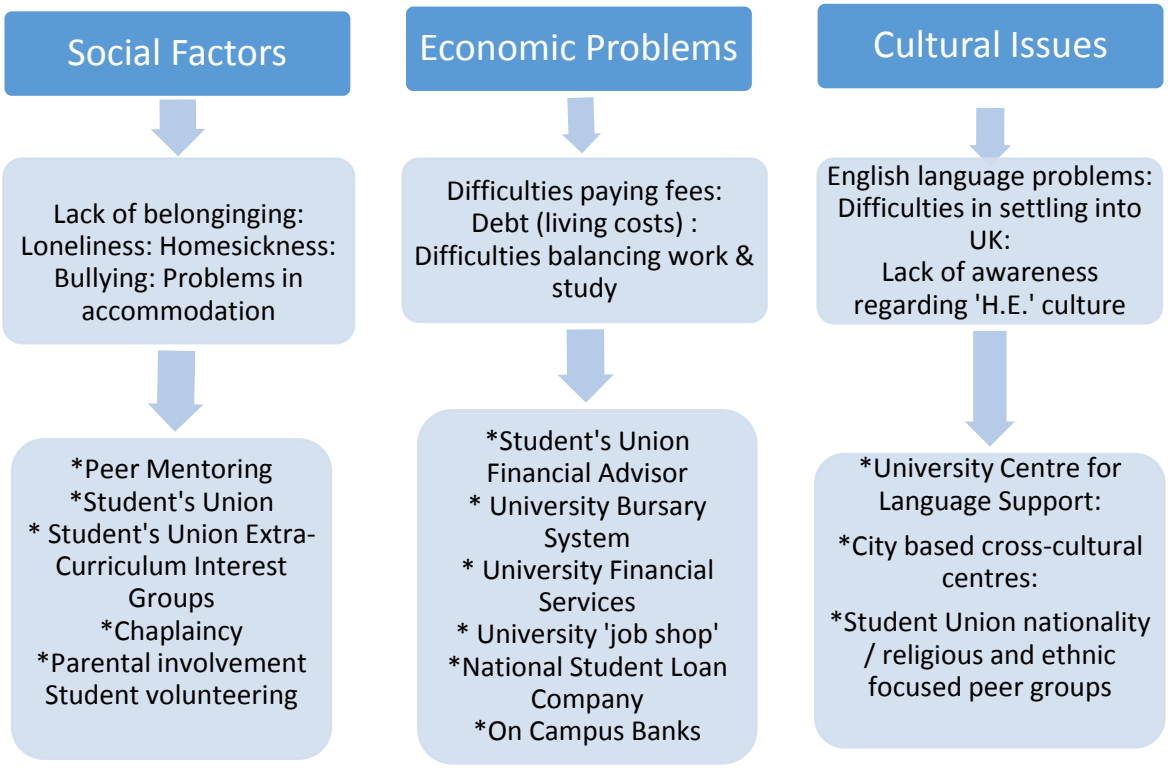


4.3 Support & Study Pathways.

In addition to identifying mental health problems as a key underlying factor which students believed impacted their studies, a number of other, non-academic issues were raised. One of the key advantages of two senior academics administering the Project was that both had built a good network of student-support related contacts across the University. This meant that bespoke Support Pathways could be developed for individual students depending on need.

Whilst acute mental health problems were prioritised and dealt with by direct intervention with the Project Leaders making all of the necessary contacts and appointments, the onus was placed upon the majority of students within the sample to take responsibility for themselves and make to contact with whichever support mechanisms were recommended by the two academic leaders. To be in a position to do this students were helped to develop their own Support Pathway and directed to where they needed to go for help. Figure 5 gives an overview of the various services to which the students were referred.

Figure 5: Student referral destinations for non-mental health or academic difficulties



Whilst all of the students reported some non-study related factors which they believed impacted their studies, the academic nature of the project was placed at the fore throughout the project. Keeping in mind the project aim of preventing attrition by dealing with failure individual Study Pathways were put into place. Like the Individual Support Pathways, responsibility for accessing academic assistance was firmly placed with the student. In this way, the importance of 'independent learning' was reinforced and a level of trust and responsibility given back to individual students. The idea that individuals should take responsibility for themselves both academically and in terms of accessing support service was deemed to be particularly important with the sample group as, having been labelled as 'failing', most had lost confidence in themselves and so lacked motivation and self-efficacy.

5. Project Outcomes and Next Steps

At the end of the academic year, the attrition rate within the School was reported to have dropped significantly, resulting in a higher than predicted this academic year. Of the 96 students originally included in the project, 90 passed the year and either progressed onto the next academic stage or graduated. Notably, one of the students who had been given an individual Study and Support Pathway achieved a BEng (1st Class Hons), placing her in the top 10% of the cohort. The three students who were given an 'Approved Leave of Absence' because of acute mental health problems all returned the following year to recommence their studies. Two of the students failed their modules for a third time. These individuals were given the option of repeating the year (and paying full fees) or leaving. One student took a Leave of Absence to do a year's paid internship as Vice-President of the Student's Union.

Having undertaken a critical review of the first year, the Changing Futures Project has now moved into the second Action Research cycle and a slightly altered version of the Project is currently underway with this year's 'failing / trailing' students. Thus far, the first few steps have been repeated and a large data-trawling exercise has revealed a similar number of students 'trailing' or 'failing' a module. Such students have been formally identified as being 'at risk' and sent, via email, the Study Support Pack (which has been extended to include Physics). The students' Personal Tutors will be notified of the situation in the next two weeks. Each individual student has been emailed and invited to a personal 'progress and planning' meeting whereby each will be invited to develop their own Support and / or Study Pathways.

6. Conclusion and Recommendations

Within the School and University the most significant unpredicted outcome of the 'Changing Futures' Project has been a raised awareness of the issues around Mental Health. Grounded in the emergent findings, a number of symposiums and training events have been held whereupon colleagues have been encouraged to make themselves aware of the various processes and services available for students experiencing acute or chronic mental health problems. The Exceptional Circumstances Application Process has been simplified and a top-level drive made to encourage tutors and students to make sure that the process is used when appropriate.

In conclusion, whilst the first cycle of the Changing Futures Project has been immensely successful, it is an extremely resource intensive and would not have happened had the two academics responsible had a personal desire to support students. No additional funding or time was given for the Project which continues to be administered on a mixture of good-will and unpaid overtime! Despite this, the primary outcome of seeing the fortunes of some of the weakest students being turned around has been exceptionally rewarding. In reflecting upon the project, ten key recommendations for institutions, colleagues and students are made:

Recommendations for Institutions:

1. **Financial Resources:** Should be ring-fenced to provide a dedicated staff post to deal with the issues around attrition in general and student failure in particular. This project succeeded because of the personal dedication of two members of staff. A purposefully employed member of staff, working with students two or three days a week could make a much greater impact, preventing students from reaching the stage where their mental health is impacted or they begin to flounder, and making sure bespoke individual advice is given at a time when it is most needed.
2. **Staff Training**: Needs to be provided for all colleagues with regards to mental health issues. This is particularly important for Personal & Subject Tutors who have day-to-day contact with students.
3. **Academic Support Services:** Work best when effectively marketed internally. Students need to be made aware of what is available and how it can be accessed
4. **Social & Cultural Support Services**: Should find a way of working together synergistically for the benefit of the students. Internal and external linkages need to be developed and carefully nurtured so that each individual student is aware of the 'full menu' of options she or he has in terms of where to go for support and leisure needs.

Recommendations for Colleagues

1. **Personal Tutors:** Attempts should be made to personally see individual tutees at least once a term, with email or other virtual contact being made at the mid and end term points. Training regarding mental health support should be accessed frequently and individual academics need to take responsibility for making sure they are aware of what university services are available. Any suspicions regarding mental health issues, even if not explicitly expressed need to be recorded and expert advice sought.
2. **Academic and Support Staff:** Are key to promoting a positive student experience and student success. Non-academic colleagues are more likely to develop close working relationships with students (particularly those who are located in 'drop in' points, 'help desks' and other key areas. Such colleagues need to access mental health training, and like academic staff, need to be aware of where and when to refer students.

Recommendations for Students

1. **Individual Students:** Are responsible for their own academic success and should identify for themselves where they can access both academic and social support.

2. **Mental Health Awareness:** Could be offered by the Student's Union, enabling students to support each other through problems.
3. **Access to Tutors:** Individual students should take responsibility for accessing their Personal and Subject Tutors.

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