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Exploring differential engagement with mathematics support from an engineering student focus

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This paper explores the differential engagement of engineering students with mathematics support at Coventry University. Mathematics support is additional help in mathematics which is offered to all students at the University, and engagement with such support is voluntary. Attendance records show that whilst many students do engage with mathematics support, there are others who do not, even though their results indicate that they might benefit from so doing. Previous studies of engagement with mathematics support have either treated the student cohort as a whole or explored the effect of a single demographic factor such as age or gender. This paper investigates the effect of a range of demographic factors on the engagement of engineering students with mathematics support.

Keywords – differential engagement; gender; age; ethnicity; engineering; mathematics support.

1. Introduction

To combat the mathematical under-preparedness of undergraduates and the rising need for a mathematically-able workforce, mathematics and statistics support (MSS) centres have now been established at most UK universities (Grove, Croft and Lawson, 2020). Although such services were originally targeted towards those who were struggling, they now aim to help all students, irrespective of mathematical aptitude.

Over the years, the way MSS is viewed has changed. Now this free, optional support that is available to students from all disciplinary backgrounds is perceived as central to the academic services a university provides (Grove, Croft and Lawson, 2020). One of the first MSS centres to open in the UK was at Coventry University in 1991, known as the BP Mathematics Centre. Since then, the name has been updated and it is now known universally as **sigma**. **sigma** was recognised as a Centre for Excellence in Teaching and Learning (CETL) by the Higher Education Funding Council for England (HEFCE) in 2005 and is one of the largest providers of MSS in the UK. It attracts students of many different disciplines with engineering students being amongst the main users of the centre. However, despite the extensive range of tailored resources available to them, many students who are at risk of failing their mathematics modules do not avail themselves of the support (Symonds, Lawson and Robinson, 2008).

In this paper, we review mathematics support engagement data from the academic year 2018/19 (i.e. before the COVID-19 pandemic when all mathematics support provided at Coventry University was in person). We compare the engagement level of engineering students with non-engineering students before focusing solely on engineering students. We discuss the effects that course, gender, ethnicity, age, and disability have on whether engineering students choose to engage with mathematics support. The effects of these demographic variables are explored through simple descriptive statistics and binary logistic regression analysis.

2. Background

Student engagement at university level has been a topic of interest for several years because of its link to higher retention rates and attainment for students. In particular, much research is now being focused on measuring the engagement levels of BAME (Black, Asian, Minority ethnic) students,

because of the attainment gap between these students and their White counterparts (Amos and Doku, 2020). This research shows that White students are more likely to attain a first-class honours classification compared to BAME students, even when special measures such as controlling for prior attainment are established (Smith, 2019). Yet, it has been found that despite the disparity in attainment, Black students, for example, participate and engage at high levels in university (Neves, 2018). Similarly, another area that has been investigated is the engagement of female students with STEM subjects, but despite the efforts of the sector, female students still are less likely to pursue STEM subjects and pursue STEM careers than male students (Eccles and Wang, 2016).

Since the establishment of MSS in universities, it has become a resounding success and is now considered to be a key form of support for students (Lawson, Grove and Croft, 2020). Many studies using surveys and interviews have been carried out to gauge student opinion on MSS and how it may be improved, as well as to discover what students believe are the reasons for non-engagement (Lawson, Halpin and Croft, 2001; O'Sullivan, et al., 2014; Symonds, et al., 2008).

Some theories as to why students do not engage with MSS have been provided in the work of Symonds et al. (2008), where it was suggested that students may give structural reasons (such as not knowing where support is available) to hide affective reasons for non-engagement, such as embarrassment. It has also been found that many students that are at risk of failing are often the same students that are unlikely to engage with the support (O'Sullivan, et al., 2014).

Furthermore, some studies have explored the effects demographic factors such as age (Edwards and Carroll, 2018) or gender (Ni Fhloinn, et al., 2016) have on whether students engage with MSS. Edwards and Carroll (2018) showed that both female students and mature students were more likely to engage with MSS than younger students and Ni Fhloinn et al., (2016) suggested that female students engage more, perhaps because of lower mathematical confidence. However, the influence of students' ethnic backgrounds or disabilities have not been considered in relation to engagement, nor the combined effect of these demographic factors.

Since MSS is designed to be a service for all students at a university, it is important to explore whether engagement with this service is uniform across the student body. If it is found that certain demographic groups engage less with MSS then it may be possible to put measures in place to encourage greater engagement by such groups. To this end, the following research questions will be explored in this paper:

Is there a difference in engagement levels with MSS when considering engineering students':

- Course?
- Gender?
- Ethnicity?
- Age?
- Disability?

3. Methodology/data analysis

In 2018/19, before the COVID-19 pandemic, the provision of drop-in MSS at Coventry University was entirely in-person. When students attended the drop-in centre, they swiped their identity card to register their visit. This recorded their student ID number, which was then matched with the demographic data that is held by the University.

In total, during 2018/19, 3594 Coventry University members made 15677 visits to the mathematics drop-in service. These students came from 271 different courses. Although this is a large number of different courses, many of them are closely related. For example, if a course is modified so that new students study something different from existing students on a course of the same title, the two courses (old and new version) will have different codes in the University database.

There are two important measures of engagement: firstly, the number of students who engaged (i.e. students who made at least one visit to the drop-in centre); secondly, amongst those students who did engage, the average number of visits made per student. Taking gender as an example of a demographic factor investigated, the raw data used were the number of students in the cohort, the number of unique students who visited at least once and the total number of visits made, for both male and female students. These figures were processed to calculate the percentage of visitors and the average number of visits made by each gender. The similarity (or otherwise) of these descriptive statistics for male and female students gives an indication of whether the demographic variable gender has a marked impact on engagement with mathematics support.

An inferential statistical analysis of the engagement data was then carried out. A binary logistic regression model was constructed using course, age, gender, ethnicity and disability status as independent variables whilst the dependent variable was whether a student had engaged with mathematics support or not. A binary logistic regression analysis in this instance indicates whether a particular demographic factor has a statistically significant impact on whether a student has visited or not. The adjusted odds ratio provides information on how likely a student from a particular demographic group would be to visit the drop-in service compared to a student in a reference group (e.g. how likely a disabled student would be to engage compared to a reference group of students with no disability declared). Some of the independent variables are binary: age (mature or not i.e. born before 1998 or born 1998 onwards), gender (male or female) and disability status (declared disability or not). Although there are many different types of disabilities recorded in the University database, the numbers in each category are small and so they had to be grouped together to obtain a reasonably sized sample. Ethnicity contained seven groups: White, South Asian (including Asian Indian, Asian Pakistani and Asian Bangladeshi), Chinese Asian, Asian Other, Black, Mixed and Other. The size of samples in each ethnicity was a consideration in determining the ethnic groupings.

Before commencing the study, ethical approval to undertake this analysis was granted by Coventry University Research Ethics Committee.

4. Descriptive statistics for the whole institution

As noted above, students from 271 courses visited the drop-in centre during 2018/19. However, many of these courses are very similar. For ease of analysis, 12 groups of cognate courses (i.e. courses which are broadly similar) were investigated. Students from nine of these 12 cognate course groups (namely Mechanical Engineering, Automotive Engineering, Motorsport Engineering, Civil Engineering, Aerospace Engineering, Mathematics, Economics, Adult Nursing and Accounting & Finance), accounted for 70% of the total number of visits made and for 50% of the individual visitors. The other three cognate course groups, Psychology, Biosciences and Computer Science, were also included in this analysis because it was believed that students from these courses tend to engage very little with mathematics support, despite their courses having a reasonable amount of mathematical/statistical content.

4862 students were enrolled on the top nine cognate course groups; of these 1792 visited the dropin centre. In other words, approximately 37% of students from these courses chose to engage. When considering the Computer Science, Biomedical Science and Psychology cognate course groups, 2337 students were enrolled on these three groups, with only 163 of them visiting the drop-in service. So, in these three course groups, only 7% of students engaged with mathematics support. This is considerably lower than the engagement in the other nine course groups.

To determine how successful Coventry University is in engaging engineering students with

Mumber of
enrolled
studentsNumber of
students using
MSS (visitors)% engagedVisitsAverage
number of
visits per
visitor

	students	MSS (visitors)			visitor
Engineering	2377	846	35.6%	4603	5.44
Mathematics	263	218	82.9%	4854	22.27
Maths-based	2308	654	28.3%	1633	2.50
Other	2251	237	10.5%	397	1.68

 TABLE 1: Total number of students, visitors and visits broken down by course type

In Table 1, the engineering umbrella includes Mechanical, Automotive, Civil, Aerospace, and Automotive Engineering. Mathematics-based courses are Economics, Accounting & Finance and Computer Science. Other courses include Adult Nursing, Biosciences and Psychology.

It is not a surprise that mathematics students engage so highly with MSS. In fact, mathematics students universally access MSS more than non-mathematicians (Lawson, 2015) to the extent that one institution provided a separate space for them so that the drop-in centre was more accessible to non-mathematicians (MacGillivray, 2008). As Table 1 shows, at Coventry University, mathematicians again are the most common users of the centre, with 82.9% of the mathematics students having engaged with the centre.

Engineering students, like mathematics students, do have a significant need for mathematics support, but it is evident that their percentage engagement is noticeably lower than mathematics students. However, they do still have a relatively high engagement rate compared to maths-based courses and other courses, both in terms of the percentage of students who engage with mathematics support and the average number of visits made by each student who does engage.

5. Descriptive statistics for engineering students

5.1 Course

To compare the engagement rate of the different engineering course cohorts seen in Table 1 (there taken as a whole), further descriptive statistics for these course groups separately can be seen in Table 2.

Engineering Courses	Number of students	Visitors	% engaged	Visits	Average number of visits
Mechanical	866	360	42%	1868	5.19
Motorsport	184	79	43%	353	4.47
Automotive	363	138	38%	716	5.19
Civil	763	208	27%	1453	6.99
Aerospace	201	61	30%	213	3.49

TABLE 2: Total number of students, visitors and visits broken down by engineering course

We can see that for three course groupings (Mechanical, Motorsport and Automotive), the percentage of students engaging with mathematics support is around 40%, but for the other two groups, the engagement is around 30%. Interestingly, although Civil Engineering has the lowest percentage of students engaging, those that do engage have the highest average number of visits.

5.2 Gender

Due to the traditional lack of engagement with STEM by female students as mentioned above, the difference in engagement by gender was examined. There is a sizeable difference in overall numbers of male and female students, as can be observed in Table 3, with around 9 times as many males as females enrolled on these courses.

	Number of				
Gender	students	Visitors	% engaged	Visits	Average number of visits
Male	2139	770	36.0%	4221	5.48
Female	238	76	31.9%	382	5.03

TABLE 3: Total number of students, visitors and visits broken down by gender

We see that male students were more likely to engage with mathematics support and to return for repeat visits too. However, it does bear noting that it is difficult to determine the effect this factor has when there is such a large discrepancy in the absolute numbers of male and female students.

5.3 Ethnicity

The Coventry University student body contains students of many ethnicities. In view of the so-called BAME attainment gap, referred to earlier, engagement with mathematics support by ethnicity was investigated first by amalgamating all non-white ethnicities into a single category, as can be seen in Table 4.

Ethnicity	Number of students	Visitors	% engaged	Visits	Average number of visits
White	1026	349	34.0%	1328	3.81
Non-White	1351	497	36.8%	3275	6.59

TABLE 4: Total number of students, visitors and visits broken down by ethnicity

Overall, the percentage of non-White students visiting the drop-in centre at least once was a small amount higher than that of White students , with the number of enrolees in each group being broadly similar, unlike the earlier comparison that was drawn between male and female students. In addition, the average number of visits made by Non-White students is much higher than that of White students. As a consequence, we see that although the Non-White group is only 1.3 times as large as the white group, it accounts for 2.5 times as many visits.

Since it is anticipated that different non-white ethnicities may behave in different ways in terms of engagement with mathematics support, it is worthwhile to divide the single Non-White group into a number of different ethnicities. Table 5 presents the engagement data with Non-White students separated into six groups.

Ethnicity	Number of students	Visitors	% engaged	Visits	Average number of visits
White	1026	349	34.0%	1328	3.81
South Asian	394	150	38.1%	1313	8.75
Chinese Asian	175	41	23.4%	119	2.90
Asian Other	200	89	44.5%	547	6.15
Black	275	122	44.4%	827	6.78
Mixed	68	22	32.4%	158	7.18
Other	239	73	30.5%	311	4.26

TABLE 5: Total number of students, visitors and visits broken down by more ethnic groups

We see that the ethnicity groups Asian Other and Black had the highest levels of engagement. South Asian students also engage at a higher rate than White students and have, comfortably, the highest number of return visits. Chinese Asian students had the lowest level of engagement and those who did engage made the smallest number of return visits.

5.4 Age

As noted earlier, the work of Edwards and Carroll (2018) indicated that, at their institution, mature students engaged more with mathematics support than younger students. A similar phenomenon is observed in Coventry University's engagement data shown in Table 6.

Age	Number of students	Visitors	% engaged	Visits	Average number of visits
Mature	1181	474	40.1%	2463	5.20
Non-mature	1196	372	31.1%	2140	5.75

TABLE 6: Total number of students, visitors and visits broken down by age

Mature students have a much higher engagement rate than non-mature students, with 40.1% of enrolled mature students having attend the mathematics drop-in. This is nine percentage points higher than the rate for younger students. However, mature students do return for slightly fewer repeat visits.

5.5 Disability

Disability is another demographic characteristic that may impact on engagement with MSS. This is the final factor that was investigated in this study. It should be noted that in Table 7 and subsequent analysis of disability, we are referring to declared disability – that is, where students have told the University (at enrolment, or subsequently, that they have a disability). It is possible that some students have a disability which they have chosen not to declare to the University. In total, across our sample of engineering students, only around 8% have declared a disability. There are a wide range of disabilities which have very different characteristics but in view of the small numbers involved, it was decided to group all disabilities together into a single category for this analysis.

Disability	Number of students	Visitors	% engage	Visits	Average number of visits
No	2190	766	35.0%	4246	5.54
Yes	187	80	36.8%	357	4.46

TABLE 7: Total number of students, visitors and visits broken down by disability status

It was found that disabled students engage at a slightly higher rate (just under two percentage points more) than non-disabled students, however the non-disabled students who do engage make, on average, one visit more than the engaged disabled students.

6. Inferential Statistics for Engineering Students

A binary logistic regression analysis was conducted to identify the effects of gender, age, ethnicity, course and disability on the likelihood of a student engaging with mathematics support at least once. The model was statistically significant with p<0.001. The binary logistic regression analysis table is provided below in Table 8.

Parameter	Beta	Wald Chi- Square	df	Sig	Adjusted Odds Ratio	95% confidence interval (Lower)	95% confidence interval (Upper)
Intercept	-0.710	46.123	1	<0.001	0.492	0.401	0.604
Aerospace Engineering	-0.531	9.687	1	0.002	0.588	0.421	0.821
Civil Engineering	-0.685	39.169	1	<0.001	0.504	0.407	0.625
Automotive Engineering	-0.022	0.025	1	0.873	0.979	0.751	1.275
Motorsport Engineering	0.160	0.882	1	0.348	1.173	0.841	1.638
Mechanical Engineering	0				1		
Mature	0.370	17.483	1	<0.001	1.448	1.217	1.722
Non-Mature	0				1		
Female	-0.091	0.361	1	0.548	0.913	0.679	1.228
Male	0				1		
Other	-0.020	0.016	1	0.900	0.980	0.716	1.342
Mixed	0.027	0.010	1	0.920	1.028	0.602	1.755
Black	0.617	18.223	1	<0.001	1.854	1.397	2.462
Asian Other	0.648	15.842	1	<0.001	1.911	1.389	2.629
Asian – Chinese	-0.502	6.327	1	0.012	0.605	0.409	0.895
South Asian	0.314	6.004	1	0.014	1.369	1.065	1.759
White	0				1		
Disability	0.324	4.117	1	0.042	1.383	1.011	1.893
No Disability	0				1		

TABLE 8: Binary Logistic Regression table for predicting engagement and non-engagement withmathematics support at Coventry University

The results of the binary logistic regression suggest that, firstly, students on Aerospace Engineering and Civil Engineering were significantly less likely to engage when compared to the reference group of Mechanical Engineering. Automotive Engineers were also less likely to engage but Motorsport Engineers were more likely to engage, however neither of these reached significance. Gender was considered as a factor for the logistic regression, however the analysis revealed there was no significant difference in engagement with mathematics support by gender. Female students returned an adjusted odds ratio of 0.913, p=0.548, meaning that although there was a reduced likelihood of them engaging compared to male students, this difference was not significant. On the other hand, ethnicity, when using White students as a reference category, was found to be a significant predictor of engagement. South Asian, Asian Other and Black students were significantly more likely to attend the mathematics drop-in. Furthermore, Asian Chinese students were significantly less likely (than White students) to attend. The differences between the Mixed and Other groups and White students were not significant. Mature students were significantly more likely to engage when compared to non-mature students. Finally, the analysis revealed that disabled students were significantly more likely to engage with MSS than students with no declared disabilities.

7. Discussion

The descriptive statistics in Table 2 and the binary logistic regression analysis summarised in Table 8 show that engagement with mathematics support varies significantly amongst the various engineering disciplines studied at Coventry University. This may appear to be a surprising result since all these engineering disciplines rely heavily on mathematics. However, there may be local factors influencing these results. The three high engaging course groups (Mechanical, Automotive and Motorsport) share a common programme in the first year of study. One of the hourly-paid tutors working in the mathematics drop-in centre during 2018/19 was a retired mechanical engineering lecturer who had previously taught on this first year programme. It seems likely that his presence in the mathematics drop-in centre attracted students from these courses and contributed to the higher engagement rates for these courses compared to Civil and Aerospace Engineering. This explanation aligns with the findings of Grove, Guiry and Croft (2020) who showed that students are more likely to engage with support when there are tutors with a similar subject profile to themselves.

Additionally, logistic regression analysis found that most demographic groups that are typically under-represented in engineering higher education were significantly more likely to seek mathematics support. The main exception to this was gender, which was not a significant predictor of engagement. This finding does not agree with similar research in the field. Ni Fhloinn, et al., (2016) found that female students were significantly more likely to engage and attributed this to a potential lack of confidence in mathematical skills. This difference in findings may be due to a difference in the populations being investigated. In this analysis, the focus is on engineering students, whereas Ni Fhloinn's work looked across the whole institution. Some of the female students in this study may have higher confidence in their mathematical skills since they have chosen (against societal norms) to pursue a career in STEM (Moakler Jr and Kim, 2014) and therefore they may have become more resilient and self-reliant and, as a consequence, do not feel as though they need further support.

For other female students, it may also be possible that, though examination stress prompts female students to engage (Hashmat, et al., 2008), mathematics anxiety ("affective, behavioural and cognitive responses to a perceived threat to self-esteem which occurs as a response to situations involving mathematics" (Dowker, et al., 2016)), may discourage them. Female students have higher reported levels of trait maths anxiety (Goetz, et al., 2013) which may potentially lead to the avoidance of seeking mathematics support.

Coventry University is a large international recruiter and the analysis undertaken here has only considered ethnicity and not home/international student status. It is possible that international students of a particular ethnicity may behave differently from home students of the same ethnicity in relation to their engagement with MSS. For example, the prior qualifications of international students are often quite different from those of home students and this can affect their need for mathematics support. There may also be more pressure on international students (for example, from those funding their studies) to achieve highly which may prompt higher levels of engagement. The effect of home/international status will be investigated in a future study.

From the regression analysis, it can also be seen that when all non-white ethnic groups are put together, BAME students are more likely to seek mathematics support. It is important to note here that despite grouping BAME students together for this analysis, the engagement of each student and the university experience of each student is unique. When conducting a more fine-grained analysis of the effect of ethnicity, the descriptive statistics show that Asian Other, Black, and South Asian students are more likely than White students to engage and the regression analysis shows this difference is significant. It seems likely that there are cultural influences producing these results. In some cultures, proficiency in mathematics is highly prized whilst in others mathematical skill may be viewed as less desirable for fear of being viewed as "geeky" or strange (du Sautoy, 2016) . In those cultures where mathematics is highly valued there can still be differences between those where the view is that proficiency should be achieved by any means possible (and so engagement with support may be seen as a sign of weakness (and so is undesirable even if the support is designed to help acquisition of a desirable skill).

For female Asian Chinese students, the low level of engagement may be explained in part by a cultural reluctance to seek help because of a fear of being seen as incompetent or inadequate (Chiu, 2010). However, (Mo Ching Mok et al., 2008) found that secondary school Asian Chinese students were not particularly afraid of "losing face"; rather, the biggest deterrent for seeking help was that they were afraid to disturb others by doing so. This study also identified that female Chinese students found more benefits in seeking help than male students. Self-efficacy and social efficacy also play a role in forming student opinions on help-seeking in that Chinese students with high levels of social efficacy were more likely to have healthier help-seeking behaviours (Ng, 2014). It is unclear thus far whether this is mirrored in their engagement with mathematics support, and so further investigation is necessary, though the efforts of mathematics support tutors to encourage and build academic self-efficacy in students are undoubtedly worthwhile.

The findings in this study surrounding the high engagement of Black students with mathematics support mirror findings relating to engagement in general at university (Amos and Doku, 2020; Neves, 2018; Panesar, 2017). In their guide to establishing MSS, Mac an Bhaird and Lawson (2012, p.10) discuss the ethos of the provision. They state that "It must be welcoming, supportive and non-threatening ... it should assist all students ... aim to give non-judgemental support to students with any mathematical difficulties in a relaxed and friendly atmosphere." Although these comments were not specifically addressing matters of ethnicity, the creation of a supportive, non-threatening, non-judgemental and positive environment for all students should promote engagement of all ethnic groups. This aligns with the work of Bunce, et al., (2021), who found, through thematic analysis, that BME students could be supported by universities to achieve their full potential by helping individuals meet their needs for relatedness, competence, and autonomy.

Mature students engaging more than non-mature students has been highlighted in previous literature (Edwards and Carroll, 2018; O'Sullivan, et al., 2014), and this result has also been seen in this study. Many mature students are returning to education after a considerable gap, and this prompts many of them to seek support. Mature students claim their motivation to study at undergraduate level is directed more by intrinsic than extrinsic desires (McCune, 2010). This intrinsic desire to learn may explain their higher levels of engagement with mathematics support. It is common for feelings of embarrassment to deter students from seeking help (Bohns and Flynn, 2010); they may not want to be seen as not being mathematically talented by their peers. This may apply less to mature students who have the in-built "excuse" of not having studied for a long time and so reasonably need help. Consequently, the drive of mature students to succeed, alongside the less powerful fear of embarrassment, may to some extent explain the higher levels of engagement by mature students.

Students who are disabled may be more accustomed to accessing support than students who do not have a disability. This may, partially at least, explain their higher levels of engagement. However, it should be recognised that the sample size in this study was relatively small and encompassed all types of disability ranging from physical disabilities such as being a wheelchair user to cognitive disabilities such as dyslexia and dyscalculia. There are obvious limitations in treating these students as a single, homogeneous group since they have very different needs. The evidence of this study shows that disabled students are more likely to access support, but more research into this is essential to determine the strength of this finding given the sample size. Further to this, Cliffe, et al., (2020) classes mathematics anxiety/phobia as a disability, which is not registered as a disability by Coventry University, further highlighting the need for more research. However, Cliffe, et al., (2020) has suggested that creating resources for effective working with such students, training MSS staff in regards to disability awareness, and successfully liasing with Disability Services, can all potentially improve how students with accessibility barriers use MSS, so it is clear to see positive progress is already being made in this area.

It should be remembered that only engineering students at Coventry University were the subjects of statistical analysis in this paper. Generalising these results to other courses (where, for example, the gender balance may be very different) across the whole institution and to other institutions should be undertaken with care. However, the findings presented here are not vastly different from the small number of previously published studies examining some similar phenomenon, and the analysis itself can be replicated at different universities.

In reflecting on possible limitations of this study, in addition to the small sample size in some demographic categories, it should be borne in mind that there is potential of these being biased findings since the research was funded by Coventry University and some of the authors work for **sigma**. Caution has been taken throughout to avoid any researcher bias through discussions with peers and through a rigorous editing process. Primarily, however, the method has been an objective, statistical analysis and we are confident that any researcher would have reached the same statistical conclusions.

8. Conclusions

The aim of this research was to discover the users, and thus the non-users, of mathematics support at Coventry University. The focus was placed specifically on engineering students because of the

mathematical demands of their courses and their typical engagement rate with **sigma**, which, though considerably higher than other courses, has room to improve.

In terms of the originally stated research questions, statistically significant differences in engagement levels of engineering students with mathematics support at Coventry University were found in terms of course, ethnicity, age and disability but not in terms of gender. It therefore appears that **sigma** is being successful in reaching out to students in demographic groups that are typically under-represented in higher education.

This study has chosen to measure engagement via a binary variable: engaged at least once or not engaged at all. Further work will be undertaken to investigate levels of engagement as measured by the number of times a student chooses to visit the mathematics drop-in centre (data on this variable is included in the tables of this paper). Future work will also seek to gather qualitative data, through focus groups and interviews, about factors that some students experience as barriers to engagement with MSS and how other students have overcome these barriers.

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