



**ESTEEM**  
THE OU CENTRE FOR  
STEM PEDAGOGY



## The Mathematics and Statistics Community of Learners

Keywords:

Student Experience, Learning Community, Student Journey

Project lead:

Rachel Hilliam

Submission date: 18/12/2020

Project Team:

Rachel Hilliam, Senior Lecturer in Statistics, School of Mathematics and Statistics

Gaynor Arrowsmith, Senior Teaching Manager, School of Mathematics and Statistics

Alexander Siddons, Operations Manager Mathematics and Statistics Student Support Team, STEM SRSC

Derek Goldrei, AL, Honorary Associate and forum moderator, School of Mathematics and Statistics

Cath Brown, Mathematics and Statistics Student, former OUSA president, and now AL

Contact point:

Rachel Hilliam; [Rachel.Hilliam@open.ac.uk](mailto:Rachel.Hilliam@open.ac.uk)

## **Executive Summary**

The Mathematics and Statistics Study Site was created in September 2017 and was one of a number of pilot study sites in the OU. Many of the resources on the site have grown out of smaller scholarship projects. The aim of this study was to evaluate the effectiveness of the site for students, ALs and SRSC staff. The main findings showed that education and senior advisors in the M&S SST found the site particularly useful and regularly used the resources in their conversations with students. However most of the SRF staff who work across all faculties, and are the front-line staff in the SRSC, were unaware of the existence of the site. There needs to be both staff development and induction for SRF staff regarding study sites. There is also a problem with students finding the site in the first place. However, once students discover the study site they use it on a reasonably regular basis, particularly for help in choosing their next module and for using the resources between module study. There is also a lack of awareness of the site amongst ALs and this needs to be addressed through staff development and in CDSA conversations. One criticism is that navigation both to the study site and around the site is difficult, and thought should be given to how students are routed to the site and to the tab headings which do not seem to be fit for purpose.

## 1 Aims and scope of project

The project's main aim was to evaluate how students, ALs and SRSC staff use the Mathematics and Statistics (M&S) Study Site.

A secondary aim was to evaluate the value which students place on various mathematics and statistics focussed events which have been run by the School, both face to face and online, during the last six years.

One specific goal was to understand how students found their way to the study site and to find new ways in which to encourage use of the website.

## 2 Activities

The Mathematics and Statistics Study Site was one of several pilot sites which opened in September 2017. Whilst the website has evolved during this period it is possible to see how students have used the website since then through analytics. However, analytics are only available for students who study one of the qualifications linked to mathematics and statistics these being:

- Q31, BSc (Honours) Mathematics
- Q36, BSc (Honours) Mathematics and Statistics
- Q46, BSc (Honours) Mathematics and its Learning
- Q77, BSc (Honours) Mathematics and Physics
- R38, BSc (Honours) Data Science
- W43, Diploma of Higher Education in Mathematical Sciences
- W77, Diploma of Higher Education in Data Analysis
- T14, Certificate of Higher Education in Mathematical Sciences
- T42, Certificate of Higher Education in Data Analysis
- S03, Professional Certificate in Practical Statistics
- S04, Graduate Certificate in Theoretical Statistics and Probability
- F04, MSc in Mathematics
- E23, Postgraduate Diploma in Mathematics
- C90, Postgraduate Certificate in Mathematics

In 2019/20 the number of students linked to one of the above qualifications was 7947, whereas the number of students studying a mathematics and statistics module as part of another qualification in 2019/20 was 7683. Therefore the analytics only provide information on about half of the students who potentially could benefit from using the website.

Analysing the website usage still provides useful information, but must be interpreted with the knowledge that the resulting conclusions are based on biased information.

Alongside usage analytics, the project team also wanted to gain feedback on how useful particular areas of the study site are and how students had first found out about it. The study site was designed to be a one-stop shop for students on any mathematics or statistics module, their tutors and student support staff, to aid with study advice in a broad sense and to help engender a sense of community. To gain feedback from all these stakeholders two questionnaires, one for students and one for AL/SRSF staff, were distributed during June/July and November 2020. The student questionnaire had a wider remit beyond the study site in order to solicit feedback on various events that the School of Mathematics and Statistics has delivered over the last 6 years.

## 2.1 Student questionnaire

The questionnaire was sent to 500 students with the following breakdown:

- a) 200 on one of Q31, Q36, Q46, Q77, R38
- b) 50 on one of S03, S04, T14, T42, W43, W77
- c) 50 on one of C90, E23, F04
- d) 100 on one of Q15, Q62, Q64, Q65, Q67, Q67, QD, R28, R30
- e) 100 studying one of the UG M&S modules not linked to a qualification

Students in categories a)-c) are studying for degrees classed as mathematics and statistics qualifications.

The questionnaire opened on the 15<sup>th</sup> June and reminders were sent to non-respondents on 24<sup>th</sup> June, 3<sup>rd</sup> July and 8<sup>th</sup> July. The questionnaire closed on 10<sup>th</sup> July and had 68 respondents, of whom 38 were studying for a mathematics and statistics qualification and 30 studying for a non-mathematics and statistics qualification, giving a total response rate of 14%.

## 2.2 Staff questionnaire

The questionnaire was sent to all M&S ALs and, STEM educational and senior advisors.

The questionnaire opened on 22<sup>nd</sup> June and a reminder was sent on 6<sup>th</sup> July, the questionnaire closed on 6<sup>th</sup> July. In total there were 97 responses: 66 from ALs and 31 from SRSC.

Due to unprecedented call volumes it was not possible for SRF staff in the SRSC (i.e. the advisors) to complete the questionnaire in June/July. Therefore a copy of the questionnaire was made which SRF staff in the STEMA SRSC completed between 27<sup>th</sup> October and 20<sup>th</sup> November. There were 38 SRF staff who completed this questionnaire.

## 3 Findings

### 3.1 Overview of the Mathematics and Statistics Study Site

The Mathematics and Statistics (M&S) Study Site was launched on 19<sup>th</sup> September 2017, primarily with the aim of providing interactives resources, module choice advice, revise and refresh content, and ways to make a head start on module study. It also has a dedicated M&S careers and employability section, jointly produced by the School and the OU Careers and Employability Services (CES) with external support from the Institute of Mathematics and its Applications (IMA) and the Royal Statistical Society (RSS). The School works with senior and educational advisors in the Student Support Team (SST) to ensure that the resources address common queries, and that the M&S SST regularly direct students to the site as a one-stop shop (Hilliam & Arrowsmith, 2019). The site hosts resources developed over several years. The tabs **Discover**, **Skills**, **Plan** and **Succeed** each correspond to one stage of the student journey and are used to provide a coherent organisation of resources, including many which are outputs from previous projects.

The UG journey starts with each student's first M&S module. A diagnostic quiz enables students to self-assess their readiness to start with MU123 or the more advanced MST124. The SST are able to give appropriate advice and guidance based on the quiz result, which hugely reduces the number of students needing to switch from MST124 to MU123 after module start, thus increasing the students' chances of success and reducing costly change of study activity (Calvert & Hilliam, 2016). The advisors' observations that there were students who even though they had completed MU123 were not confident to study MST124 prompted the *Revise and Refresh for MST124* (R&R) resources, which include quizzes, short explanatory texts, screencasts of worked examples, tutor-moderated forums and revision tutorials.

The use of diagnostic quizzes and R&R was expanded across many of the UG M&S modules and the resources collated into the **Discover** area together with resources for other new initiatives (Pawley & Hughes, 2018). One such initiative, the *Early start* programme on M140, was developed following analysis

of student feedback within a project which explored what enables students to succeed when indicators predict they will struggle. The programme, which offers tutor-led support for three months before module start, successfully improved retention (Calvert & Hilliam, 2018). Since 2019 every M&S module has had sample content available on the site, in addition to its diagnostic quiz, enabling students to make informed choices by getting a taste of the modules.

The diagnostic quizzes, *R&R* and *Early Start* give students the opportunity to experience the look, feel and pedagogical approach of each module before registering. Their success has resulted in the **Discover your module** (DYM) subpages, which typically contain the diagnostic quiz, syllabus, outline calendar, R&R subpage and first two units for each undergraduate M&S module. There is a pre-module forum to support students use of these resources.

The study site provides a one-stop shop to help students choose their next module, use the time between presentations to revise pre-requisite knowledge and/or to make a head start. For undergraduates this is supported by the popular *M&S advice* forum, to which students, ALs, central academics, staff tutors and SST staff all contribute, creating an online community for mathematics and statistics (Hilliam & Goldrei, 2019). Whilst the focus of this forum is on module choice, it also provides a place for students to feedback on other issues. A *PG café* forum on the study site performs a similar role for the MSc students.

### 3.2 Analytics

The following results only show analytics for students who are registered on a mathematics and statistics qualification. Since the website went live on 19<sup>th</sup> September 2017 there have been 7500-8000 students who have potentially been eligible to use the site and for whom analytics would have been recorded.

Roughly half of the students use the site on a monthly basis (Figure 1, Table 1). Figure 1 shows the number of different students who visit the site each month: this is referred to as the number of unique monthly visits. Each of these individual students may go on to visit the site several times within each month: this is referred as the total monthly visits and shown in Figure 2. The annual pattern, with peak usage in September when module sites open and in June/July when most module results are released, is clearly visible. There are dips around the holiday periods of Christmas and Easter each year.

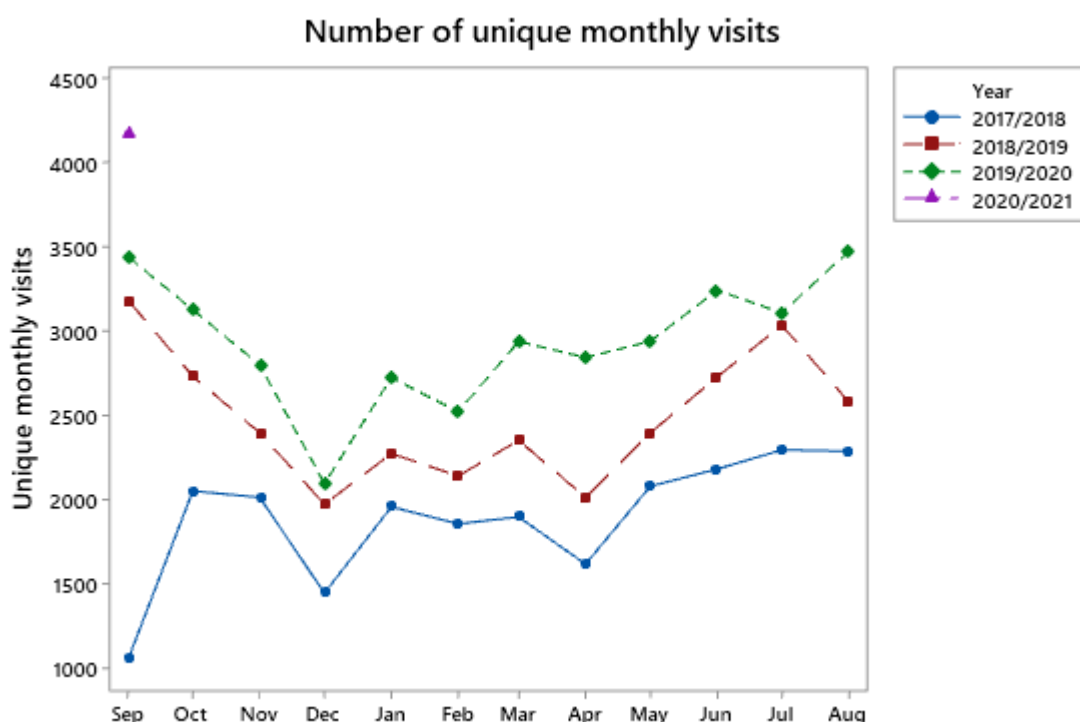


Figure 1. Number of unique monthly visits to the M&S study site from September 2017 to September 2020

Whilst less than half of the students who are linked to a mathematics and statistics qualification appear to use the site, it is clear that once students find the site they return to it on a regular basis as shown by the total number of monthly figures (Figures 2 & 3, Table 1).

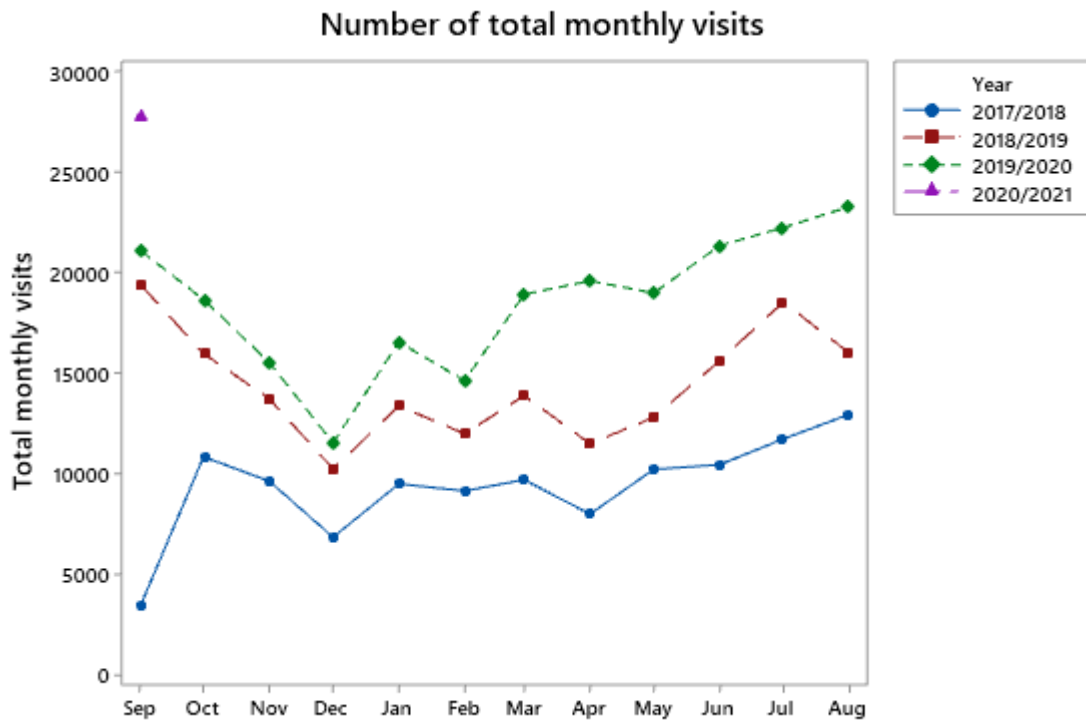


Figure 2. Total number of monthly visits to the M&S study site from September 2017 until September 2020

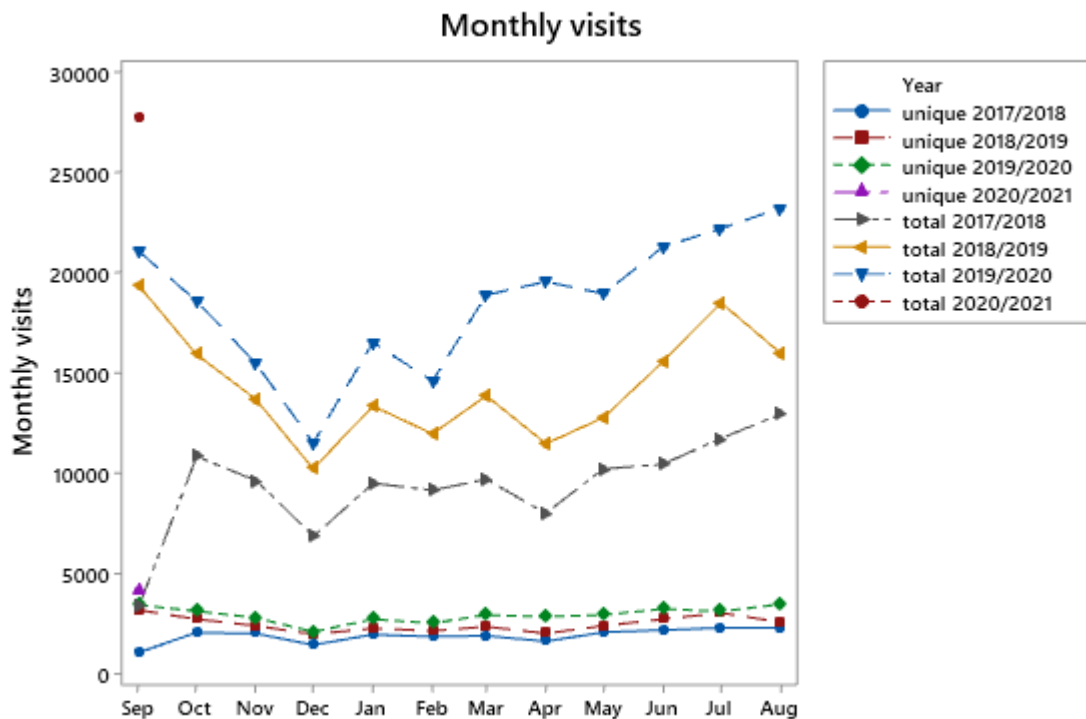


Figure 3. Unique and total number of monthly visits to the M&S study site from September 2017 until September 2020

	Unique number of monthly visits			Total number of monthly visits		
	Mean (sd)	Min	Max	Mean (sd)	Min	Max
2017/2018	1895 (365)	1053	2296	9359 (2466)	3365	12941
2018/2019	2484 (382)	1973	3184	14414 (2774)	10237	19415
2019/2020	2939 (388)	2096	3475	18518 (3428)	11527	23258

Table 1. Descriptive statistics for the unique and total number of monthly visits to the M&S study site from September 2017 until September 2020

There is an increase in the number of students using the site year on year, with roughly the same monthly variation within the year (Table 1). Students clearly find the study site useful. However, there is an issue with students finding the site in the first place, even though the number of students using the site has increased each year. In order to signpost the study site more clearly several initiatives were put in place during 2019/2020 including: the creation of a student newsletter which highlighted the study site; providing an outline of the study site on the back of the UG module contents checklist mailed out to students with their print texts; inclusion of website links in MILLS messages; reinforcement by SST individual contact; and a series of emails, particularly aimed at newly registered UG students, pointing towards the DYM pages.

It is clear that there has been a large increase in numbers of students using the study site in September 2020 which may well have been as a result of CAMEL messages sent in August to everyone registered on any UG M&S module for 20J pointing to the DYM pages. CAMEL messages were also sent in June to all students completing a 19J UG module, and in July to all UG M&S ALs highlighting the study site. In addition there was a tweet about the study site on 24<sup>th</sup> June and it was mentioned in the Student Hub Live event on 23<sup>rd</sup> September. There was certainly a greater number of students using the study site in September 2020 than in previous years, with 4176 unique monthly visits and 27800 total monthly visits for September 2020.

As can be seen in Figure 4, there are seasonal peaks in daily usage around mid July, which coincide with module results being released and mid September when module websites open. All the M&S module sites have links to the study site. There are also two peaks 4-7 Nov 2019 (unique visits: 644, 757, 535, 447) and 17-19 March 2020 (unique visits: 699, 709, 476) when students were sent a message with a link to the new M&S newsletter, *Open Interval*, <https://learn2.open.ac.uk/course/view.php?id=206217&cmid=1563436>.

All messages which encourage students to visit the site appear to result in an increase in the residual number of students who keep returning to the site.

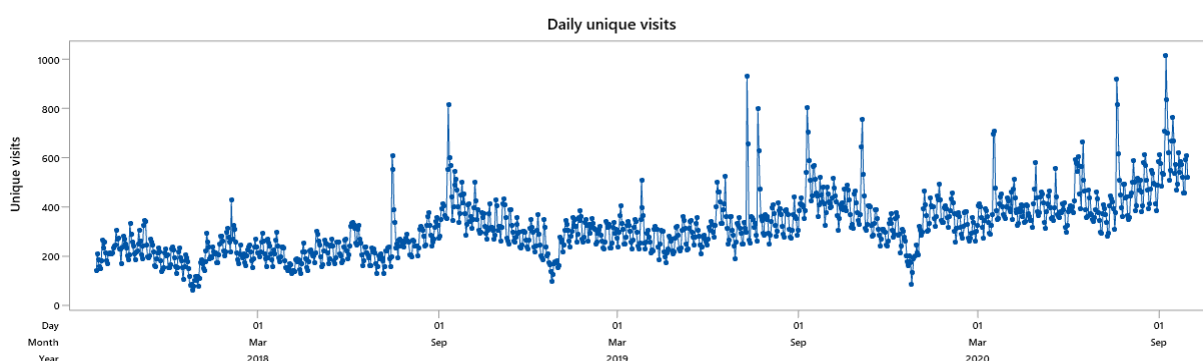


Figure 4. Unique daily visits to the M&S study site between 17th September 2017 and 30th September 2020

### 3.3 Student questionnaire (Study Site)

The response rate was 14%, with just over half of the respondents studying for an M&S qualification (Table 2), and therefore the proportion of respondents of M&S versus non-M&S qualifications, including stand-alone module study, is equivalent to the population proportions.

M&S qual	Non M&S qual	Total
38	30	68

Table 2. Respondents study goals

### 3.4 Using the M&S Study Site

Whilst 73% of respondents had used the study site, there is a difference between the proportion of M&S qualification students who use the site (84%) compared to non-M&S qualification students (60%) (Table 3). As students are routed to their 'home' qualification study site it is less likely that students studying M&S modules as part of a non-M&S qualification will find the M&S study site.

	M&S	Non M&S	Total
Yes	32 (84%)	18 (60%)	50 (73%)
No	6 (16%)	12 (40%)	18 (27%)
Total	38	30	68

Table 3. Student: Have you used the M&S Study Site?

The 18 respondents who had not used the study site were asked why not. A high proportion, 67%, of non-M&S students did not realise the site was there, compared to only 17% of M&S students. The main reason for M&S students not using the site was that they had not needed to use it (Table 4). There is perhaps more work to do with M&S students in terms of pointing out the benefits of different areas of the site.

	M&S	Non M&S	Total
Did not realise it was there	1(17%)	8 (67%)	9 (50%)
Have not needed to use it	5 (83%)	1 (8%)	6 (33%)
Have not had time to engage with it	0 (0%)	3 (25%)	3 (17%)
Total	6	12	18

Table 4. Student: If you have not used the M&S study site, please state why not.

Most students find the site from either a link from their module webpage or a link from StudentHome. However the latter is considerably smaller for non-M&S students as there is no obvious way to link from another qualification (Table 5, Figure 5). One of the most effective ways of pointing students to the site is from direct email contact with the OU regarding studies. This may well explain why there is such an increase in the number of students using the M&S site in September 2020 (Figure 1, Table 1) as there had been several emails pointing students to the site during the summer. It is therefore important that all messaging regarding study, e.g. MILLS messaging, should contain links to the study site.

	M&S	Non M&S	Total
Link from module webpage	19	11	31
Link from Student Home	25	12	39
Information on Content Checklist sent with your M&S module books	3	6	9
Mathematics and Statistics Newsletter, OpenInterval	2	2	4
Discussion with the SST	1	5	6
Discussion with a tutor	1	4	5
Discussion with a fellow student	1	2	3
Information on a card about the Study Site	0	0	0
Email from the OU regarding your studies	7	6	13
New to OU study (induction)	3	4	7

Table 5. Student: How were you made aware of the site? Choose as many options as apply.



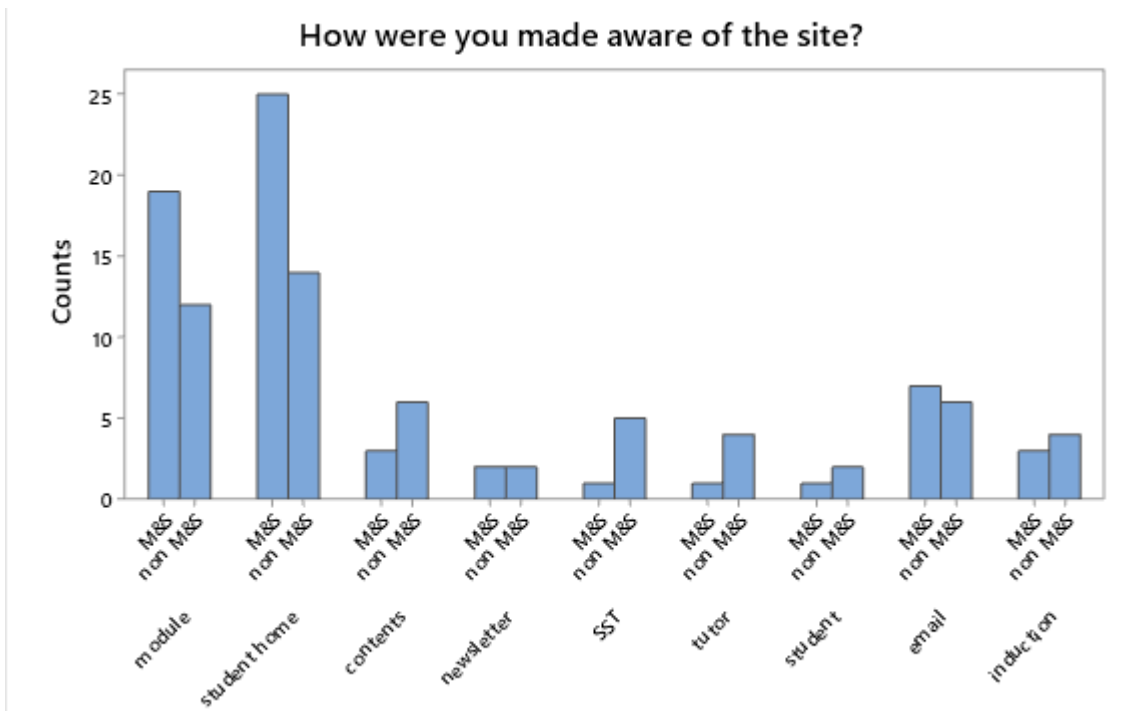


Figure 5. Bar chart showing how students were made aware of the site.

The most popular use of the site is to help students to choose their next module, make a head start and revise and refresh their knowledge (Table 6, Figure 6).

	M&S	Non M&S	Total
Help when choosing next module	21	12	33
To get a head start	24	12	36
To revise and refresh	19	7	26
To get careers advice	4	2	6
Info about external M&S societies	2	4	6
Connect with other M&S students or staff	9	6	15
Browsing	12	6	21

Table 6. Student: How do you use the Study Site?

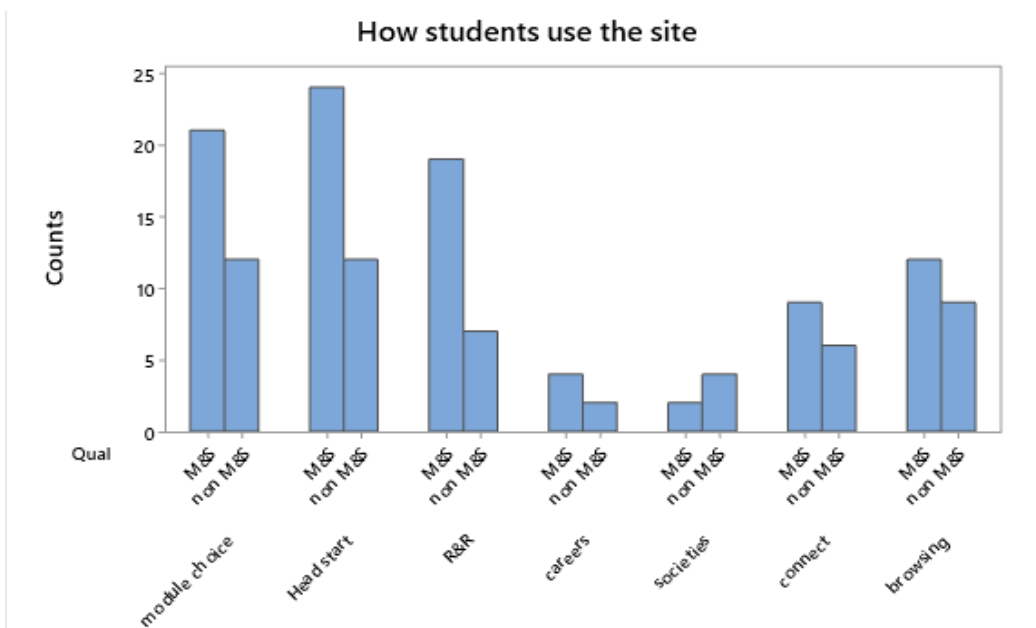


Figure 6. Bar chart using how students use the study site.

### 3.5 Rating of resources

Students were asked to rate how useful various resources on the M&S study site were. Students found the *Discover Your Module* and *Are You Ready For?* (AYRF) quizzes the most useful areas of the site with 40 students in each case finding these resources quite or very useful (Table 7). It is noticeable that more M&S students find these resources more useful, as many of these resources are potentially of equal, if not more, benefit to non-M&S qualification students who need to check that the module in question is appropriate for them.

	Not use the resource			Not at all useful			Only slightly useful			Quite useful			Very useful		
	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total
M&S advice forum	13	6	19	0	0	0	4	2	6	9	6	15	5	4	9
Teaching & schools forum	20	9	29	1	0	1	5	1	6	5	3	8	1	4	5
Postgrad café forum	16	11	27	1	2	3	4	0	4	5	1	6	6	4	10
AYRF quizzes	3	1	4	1	0	1	2	3	5	16	7	23	10	7	17
DYM pages	1	3	4	2	0	2	1	2	3	13	4	17	14	9	23
SKILLS	11	9	20	2	0	2	2	3	5	10	3	13	6	3	9
PLAN	11	8	19	2	0	2	2	5	7	10	2	12	7	3	10
SUCEED	15	9	24	1	0	1	2	5	7	8	2	10	5	2	7

Table 7. Student: How useful are the following resources?

The following comments were provided, highlighting how difficult students find both navigating to the site and around the site. There is a need for better tab headings to help students.

*Sometimes it's a bit of a maze to find things, plan and succeed aren't very specific the labelling of the sections aren't clear in describing their contents, so it slows you down, I like on module specific websites headings like assessment, forum.*

*It's really hard to find things on the OU website, sometimes I stumble across things by accident and it I don't bookmark it, I can never find it again.*

*All of the resources listed are virtually non-existent for PG students. To make them useful, there would need to be significant investment of time to flesh them out for postgraduate.*

*The resources are great: still it's still quite difficult to find some things, to find say the Revise and Refresh material still takes quite a bit of hunting.*

One piece of feedback resulted in a discussion at the M&S Board of Studies and the decision to create a separate UG student discussion forum on this the site, with the aim of keeping the advice forum more focussed.

*There are too many menus and submenus, and the groups are not always logical. It would be helpful if there was an overall a-z index or table of contents or better search facility. The postgrad director is very proactive with announcements on the postgraduate forum which makes it an extremely useful resource. The general maths and stats advice form is filled with too much gossip and chatter among a few dominant students so it's hard to tell what's fake news and what's official OU information.*

Students who do use the resources particularly like having some module material and resources available ahead of their module start.

*I really like the idea of making some selected topics available ahead of the module. So far this really helped for my studies with work and family life. Well done.*

It is worth noting that various OpenLearn and Futurelearn resources are linked to from various places on the study site, but the following piece of feedback suggests that students don't always find these.

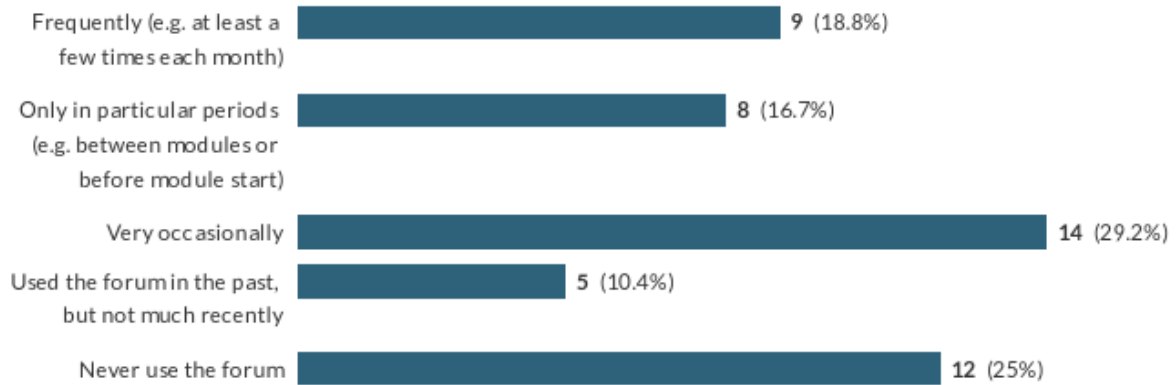
*As a level 1 student some of the resources don't feel applicable currently (such as career info) but would be useful later on. As a new student, with little previous maths experience, I've found the resources for getting started with the modules very helpful. It would also be good if other relevant support resources (e.g. futurelearn openlearn) were linked on the site.*

Students were asked how frequently they used the forums. In general the students who use these forums appear to use them occasionally rather than on a frequent basis (Table 8, Figure 7).

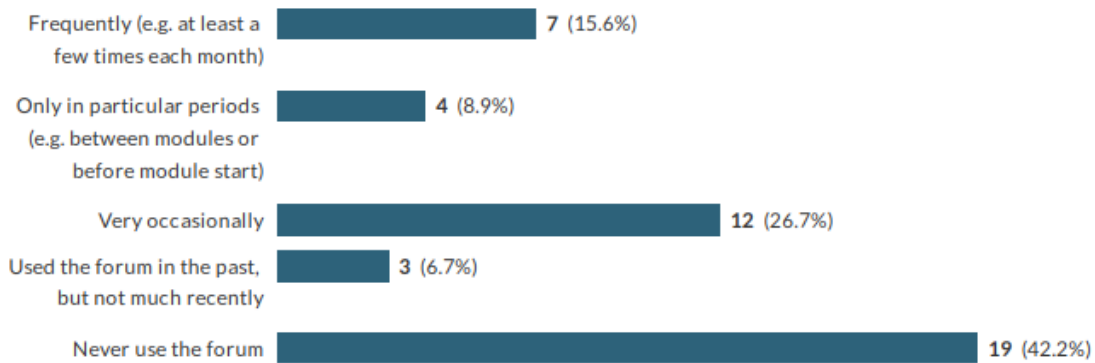
	Frequently			Particular periods			Occasionally			Used in the past			Never used		
	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total
M&S advice forum	7	2	9	4	4	8	9	5	14	2	3	5	9	3	12
Teaching & schools forum	4	3	7	4	0	4	6	6	12	2	1	3	13	6	19
Postgrad café forum	8	2	10	1	2	3	7	2	9	0	1	1	13	9	22

Table 8 Student: How do you describe the way in which you use the forums?

### M&S advice



### M&S teaching and schools forum



### Postgraduate café forum

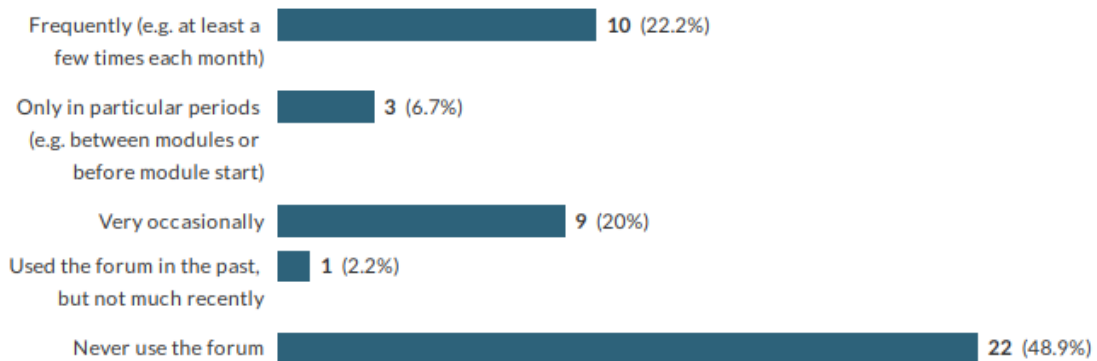


Figure 7. Bar charts showing how frequently students use the forums

When asked to rate how useful students found the resources on the DYM pages, a high proportion rated them as quite or very useful, with a greater percentage of M&S students giving the resources a high rating. Students were asked how they rated each of the resources on the DYM pages. All of these resources had high proportions of students rating them as quite or very useful (Table 9, Figure 8), with a greater percentage of M&S students giving the resources high ratings.

	Not used the resources			Not at all useful			Only slightly useful			Quite useful			Very useful		
	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total
AYRF quiz	3	1	4	0	0	0	4	3	7	11	5	16	14	8	22
R&R	4	4	8	0	0	0	2	3	5	11	5	16	15	6	21
Contents list	3	3	6	0	0	0	3	1	4	6	8	14	19	6	25
Study calendar	6	3	9	0	1	1	2	1	3	7	7	14	17	6	23
Module guide	2	2	4	0	0	0	0	1	1	8	8	16	22	7	29
Sample units	3	5	8	0	0	0	1	1	2	9	9	18	19	3	22

Table 9. Student: How would you rate each of the following resources on the *Discover Your Module* pages?

When asked how the Discover Your Module pages could be improved, students wanted similar resources for the postgraduate modules and more sample module material. However, it was noted again that navigation around the resources was difficult.

*It could be useful if more sample module units were made available, perhaps after registering for a course.*

*A similar comprehensive resource, such as a study calendar, a detailed contents list, AYRF quiz, and revise and refresh for the postgraduate modules.*

*Consider giving a sample TMA.*

*Just improve the navigation.*

When asked if anything was missing from the study site, students commented on a need for links to other external resources which might help them with their study, such as the Khan Academy and module Facebook groups.

*I think having relevant additional support resources/links to other external resources would be helpful. The students on my current module share links to sites like Khan Academy for additional support when others are struggling.*

*Possibly some links to external relevant resources, for example, there are active and well managed Facebook groups for maths in general and for specific modules. Maybe make the M500 society more prominent too.*

*Daily news about maths, not limited to just OU maths.*

*More screencasts will be very useful.*

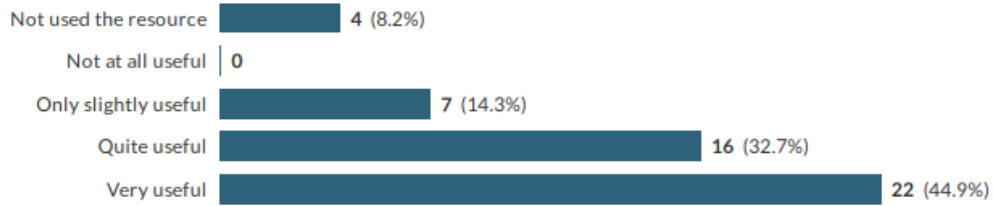
General feedback from students about the site focussed on the difficulty with navigating around the study site and finding the site, though when students do find the study site they particularly appreciate being able to get access to module material.

*It could be more linear. I find there are often several different ways to get to the same pages. Which feels like you get 'lost' in the pages. I feel a more straightforward progression of links would be clearer.*

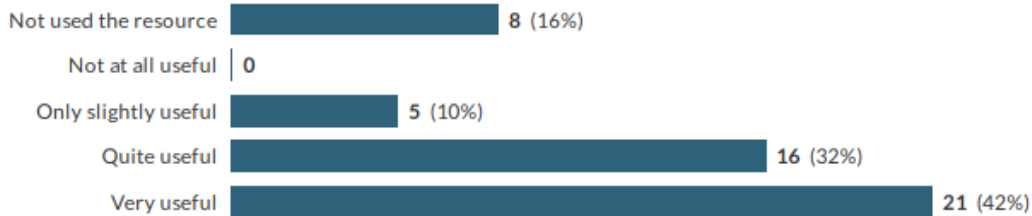
*The navigation isn't particularly intuitive. This is probably because the postgraduate material has been shoehorned into a structure that was designed for undergraduate studies.*

*I have found it very helpful for accessing additional information about possible modules I can study than is provided by the general module descriptions, as well as accessing materials to get started with the module, which has been very useful.*

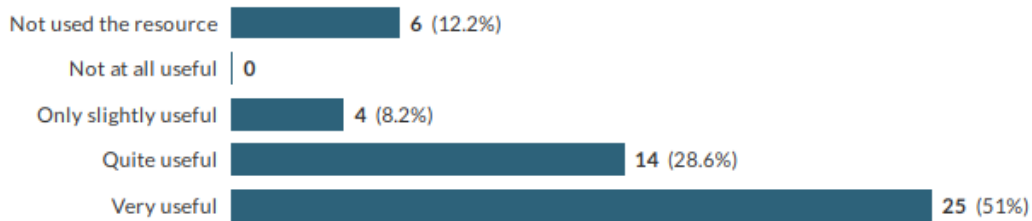
### AYRF quiz



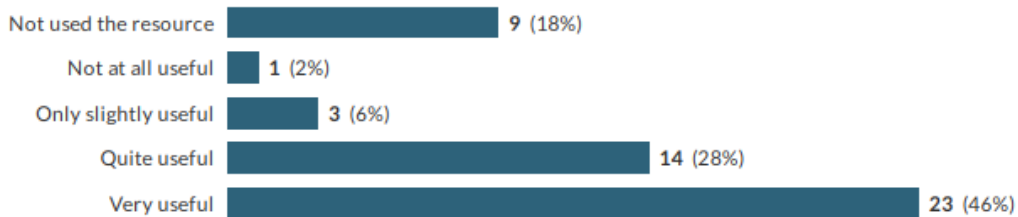
### R&R



### Contents



### Study calendar



### Module guide



### Sample units

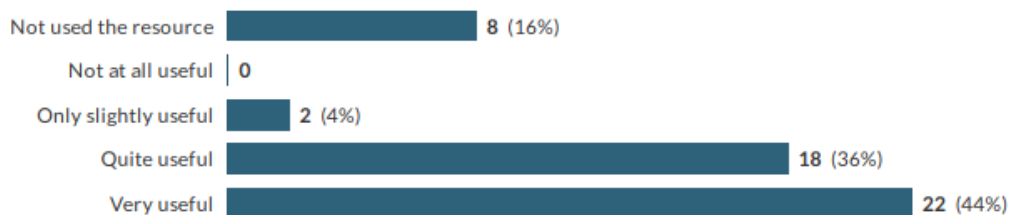


Figure 8. Bar charts showing how students rate the DYM resources

### 3.6 Staff questionnaire

In total there were 135 responses; 65 from ALs, 32 from SST staff and 38 from SRF staff in the SRSC.

The ALs tutored on a range of different M&S modules with a good spread across all levels and sub-disciplines (Figure 9). There were 5 ALs who each tutored on at least one of A111, A223, SM123, T192, T193, Y033 in addition to their M&S module tutoring.

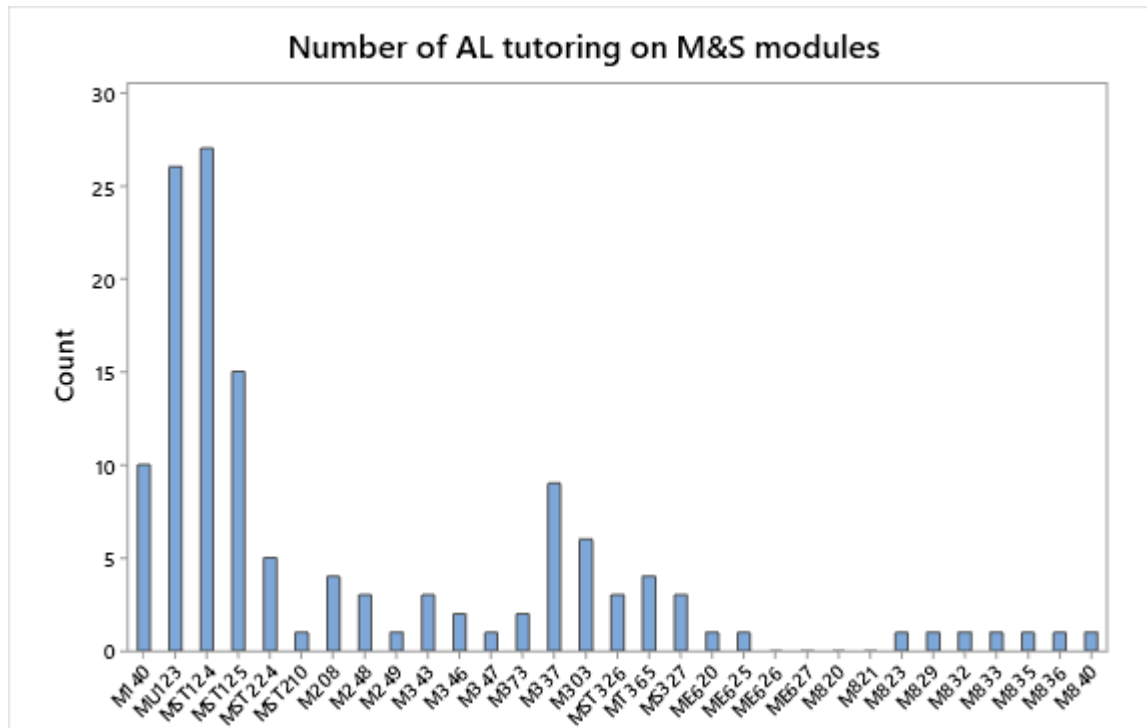


Figure 9. Bar chart showing the M&S modules tutored by AL respondents

The STEM Student Recruitment and Support Centre (SRSC) is responsible for Access and four subject SSTs:

- M&S, Mathematics and Statistics
- C&C, Computing and Communications
- E&I, Engineering and Innovation
- Sci, Science

Each of these SSTs has two types of advisory staff:

- Senior Advisors who work in the SST giving advice and are specialists in the curriculum, but who also work across the other schools. (At the time of writing there are 6 M&S Senior Advisors.)
- Educational Advisors who work in the SST giving guidance and are specialists in the curriculum. (At the time of writing there are 3 Educational Advisors in M&S.)

In addition to these staff there are Advisors who work in Student Recruitment and Fees (SRF). These are front-line staff and do not specialise in the curriculum but provide more general information to students.

Educational and Senior Advisors from all the SSTs in STEM, based in Manchester, responded to the questionnaire (Figure 10). Often these staff work across curriculum areas at busy periods, so it is important that all SRSC staff are aware of the study site resources. Unfortunately the SRF staff were initially unable to take part in the questionnaire due to unexpected high numbers of calls during June/July, but 38 SRF staff completed the questionnaire during November.

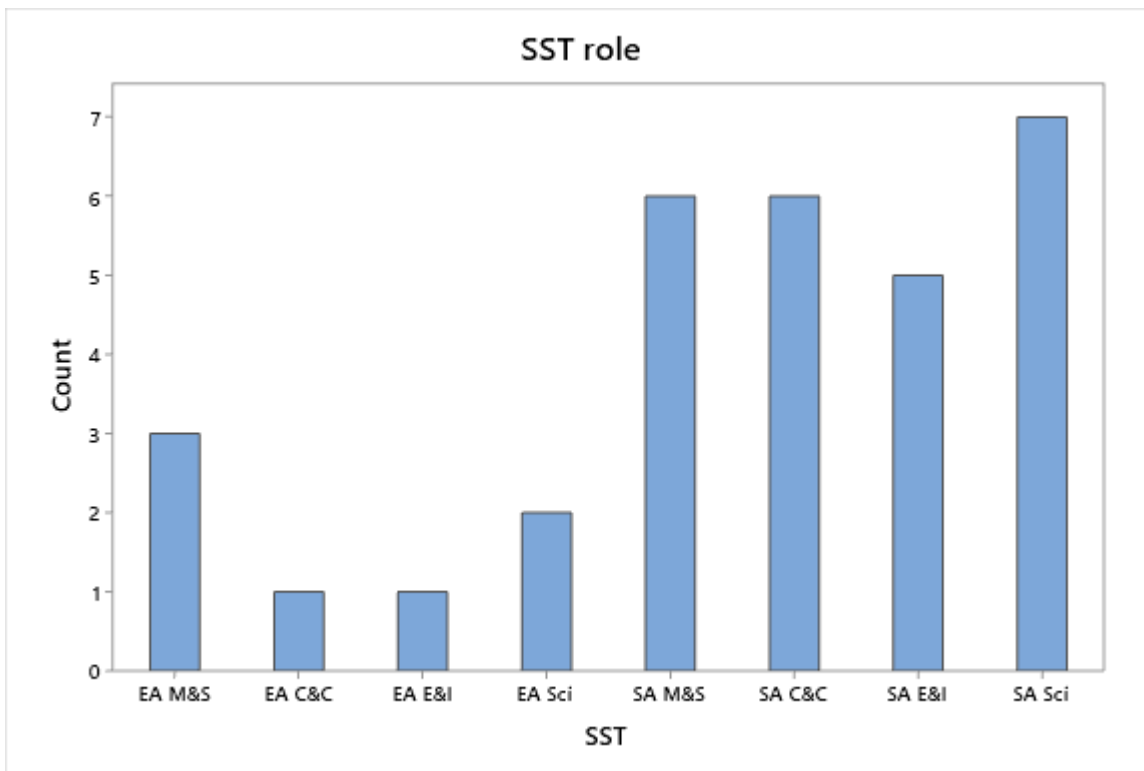


Figure 10. Bar chart using the job role of the SST respondents

The majority of SST staff, 93%, but only 56% of ALs had used the Study Site (Table 10). When the study site was created in 2017, one of the aims was to provide an area with readily available resources which advisors could point students towards. The study site has been demonstrated at several SRSC briefings and it was therefore particularly gratifying to see that the site was well used by all Senior and Educational Advisors, not just those in the M&S SST. The high proportion of ALs who have not used the site clearly indicates that more communication with ALs about the study site needs to take place.

	AL	SST	SRF	Total
Yes	36 (56%)	29 (94%)	13 (34%)	78 (59%)
No	28 (44%)	2 (6%)	25 (66%)	55 (41%)
Total	64	31	38	133

Table 10. Staff: Have you used the M&S Study Site?

The main use of the site by SST staff is to direct students towards resources and to enhance their conversations with students, though a number of staff also use the site for their own information (Table 11). Any SRF staff who use the site do so to point students towards resources. A disappointingly low number use the site to aid their conversations with students. The majority of the 36 ALs who use the site use it both for their own information and to direct students towards the resources. This means that when ALs have found the site, they clearly find it useful for their own purposes and to help their students.

	AL	SST	SRF	Total
For my own information	32	16	4	52
To point students towards resources	30	28	12	70
To aid conversations with students	17	27	6	50
To link up with other M&S staff and/or students	3	1	0	4

Table 11. Staff: Why do you use the Site?

Most ALs who had not used the site either didn't know it existed or had not found a use for it (Table 12). Half of the SRF staff who answered the questionnaire did not know the site existed. It is a concern that 9 members of SRF staff have not found a need to use it, given that there are a large number of resources on



the site to help with module choice. More positively there were only 2 SST staff who had not used the site: one who didn't realise it existed was a senior advisor in the E&I SST; and a senior advisor in C&C had not had time to engage with this site. This means that all the SRSC who are linked to M&S knew about the study site and used it.

	AL	SST	SRF	Total
Did not realise it was there	17	1	19	37
Did not know how to find it	5	0	3	8
Have not found a need for it	14	0	9	23
Do not have the time to engage with it	6	1	4	11

Table 12. Staff: Why have you not used the M&S Study Site?

Most members of staff (even those that had not yet used the site) found the resources useful, in particular the AYRF quizzes and DYM pages, all of which the majority of ALs thought were either quite useful or very useful (Table 13).

	Not at all useful				Only slightly useful				Quite useful				Very useful			
	AL	SST	SRF	Total	AL	SST	SRF	Total	AL	SST	SRF	Total	AL	SST	SRF	Total
M&S advice forum	1	0	0	1	2	3	4	9	26	12	20	58	21	12	9	42
Teaching forum	4	0	1	5	10	3	6	19	23	16	18	57	12	8	8	28
Postgraduate café forum	13	0	2	15	9	7	7	23	17	15	18	50	7	4	6	17
AYRF quizzes	1	0	0	1	3	0	0	3	15	0	9	24	34	30	30	94
DYM pages	1	0	0	1	3	0	1	4	13	3	10	26	35	27	23	85
SKILLS	1	0	0	1	5	0	1	6	23	11	17	53	19	16	17	52
PLAN	1	0	0	1	6	0	1	7	19	6	17	42	22	22	17	61
SUCCEED	1	0	0	1	10	1	2	13	20	12	18	50	17	14	15	46

Table 13. Staff: How would you rate each of the following resources for use by you or your students?

Staff were also asked to list other resources that they used on the site. Those included came from a range of areas such as the one containing material from discontinued modules, sample study planners (on the DYM pages) to aid with conversations around study advice, reference request information, assessment strategies, and information about new curriculum (e.g. the M838 pilot).

*I've used the sample study planner to look at how module deadlines might overlap, e.g. if I take on a new module. Access to the first few units is useful to point out to students who ask about different modules.*

*To direct students towards the units for discontinued modules (M381, M338) for study over their summer break.*

*M838 pilot resources in Discover area.*

*I get asked a lot about references so it is good to have somewhere to direct students for help with this.*

*It is extremely helpful to have information on calculators, exams, TMA submission etc, and this is something I make use of throughout the year with my students. The two things that makes this resource so valuable are (1) that these things are all collected together in one place, but (2) that they are specific to M&S.*

*The Assessment page is useful to collect together the different strategies used across the various modules. However, I tend to point students to this resource less frequently, because they tend to ask me (their tutor) about assessment when they are on their module – and at that stage I want to encourage them to engage with the module website as much as possible.*

Resources that staff thought were missing from the site included: clearer links to other study sites; general mathematical problem-solving skills; a resource to alert students to the recommended route through the MSc (which is longer than the OU advertised 2 years); and having the computer algebra guide available on the software page.

*Clear links to other subject sites, e.g. Science but especially Physics.*

*General problem solving skills – how to approach a maths question, what to do when you hit a brick wall.*

*Maybe more videos e.g. 'how to' guides alongside what's already included, if that were appropriate?*

*Could be useful to have something on the PG page to say that the F04 has a recommended route which takes longer than the advertised 2 yrs on the OU website – many students try to, which causes issues.*

*On the Software for M&S study page, there is a link to the OU's Maxima website, this is helpful, but it would be very useful to have the MST125 computer algebra guide prominently on the Software for M&S study page (much as the MST125 unit on mathematical typesetting is available on that page).*

There were several comments from ALs asking to be made aware of such sites through staff development events or at CDSA.

*Staff development events should include updates on the resources available to tutors, and more importantly to students, that we do not always see. Presentations at staff development events should summarise the contents of these websites and give practical examples of their proven worth. Websites often contain information that is embedded and not easy to see, let alone use. Visiting a website does not guarantee that all of its contents are read let alone know. I am embarrassed that I did not know about this site. CDSA could include checklists for staff tutors and ALs of core websites and sources of information. A relatively new AL (which I am not) could be totally blindsided. Only this email has alerted me to this websites existence, which was not the emails primary purpose, I presume!*

*It all looks very useful, I just hadn't been aware of its existence before this survey, though I was aware of bits like the AYRF and Discover pages.*

*How I was unaware of this site, I do not know. Now that I have discovered it, I am delighted to say, not only shall I refer to it now and again, but I shall also make a point of mentioning it to my students at the beginning of each new module session, e.g. 20J onwards.*

It was also clear from the comments from SRF staff that they needed to be made aware of this site and would use it in future conversations. It is also worth noting that the MathsChoices website referred to in the quote has been replaced by the website <https://learn1.open.ac.uk/site/openms>.

*There are some good content here but it is not advertised / directed to Student Advisors – had it not been for this survey I would not have known this existed.*

*I wish I knew about this. As a relatively new member of staff, this will be a great resource for further learning for myself, and to direct learners to.*

*I feel that once you know where to find the information, it has all the information needed for students.*

*These all look like really useful resources that I have only just found via this survey – I do send students to the Are you ready for quizzes, which I've accessed through the Maths Choices website. A straw poll of my team members in SRF (8 advisors) suggests they are not aware of it either.*

SST staff find the *Discover Your Module* pages particularly useful for conversations with students.

*I find the discover your module pages and AYRF pages incredibly useful and will always send links through to students if they want to decide whether to take a particular module or explore the modules open to them.*

*I mainly use the forum and forum tabs. Most of the conversations I have are about qualification/module advice rather than study skills.*

*I use the diagnostic quizzes, pre- and co-requisite page, discover your module etc.*

*For me the AYRF quizzes and the module information are really useful – not only to inform my conversation but also so I can get students to self serve.*

*I used the ‘are you ready?’ resources to help students check their readiness but was unaware of a lot of other resources available. I believe some short training or a briefing on the website would help raise awareness.*

*Discover – Are you ready for ... This is probably the area I use most with students at the beginning of the module. Some students need a lot of extra help with basic maths skills for statistics and/or calculus. Succeed area also very useful as students are usually coming to the end of their undergraduate students and wanting information to help with further study, career changes etc.*

Other suggestions included a step-by-step navigation wizard and highlighting different areas of the website at certain times of the year. The latter is something that already happens through MILLS messaging.

*Arguably, if it were possible, a step-by-step navigation wizard would suit a lot of learners. You could to on Start Here (better located on the front page) and work through all the main steps link in online training systems.*

*Some of the resources are much more useful at certain times of year. For example, Are you ready for? quizzes are a hugely important resource as students are thinking about their next modules, but less so at other times of the year. I’m not suggesting the resources themselves should be changed throughout the year, but it could be worth considering signposting students to certain bits at certain times of year – eg. as news items on module websites.*

There were several comments from SRF staff who thought the site needed a clearer layout.

*The site looks very cluttered. The first time I used it I was nearly put off looking for what I was after because of this.*

*There is a lot going on on the webpage, maybe a different layout may appear less daunting for new students.*

In general feedback on the site is very positive, particularly from SST staff who use the site on a regular basis when talking to students. The forum was noted as somewhere that advisors send students to when they ask about module choice advice. The main concerns were about ensuring students are pointed to the site and navigation around the site, but generally there were many comments from SST staff who said the M&S was the best study site they use.

*Very useful to direct students to resources for future modules they may be studying. Also the typing mathematics notation links is useful.*

*I regularly suggest students visit the forum for advice on module choices. Students tend to ask my advice, but I don’t have broad enough knowledge, so I direct them to that forum.*

*I think there is a lot of useful information on the site but I always struggle to find it. It would be much more useful if there was a direct link that was easy to access for tutors.*

*It is so valuable to us to have a resource like this to refer to and to steer students towards/provide a link. Student ‘self serve’ is a big help and at least the more information they have can assist in their own decision-making process. That in turn can cut down any confusion and unnecessary information exchanges.*

*As a Maths and Stats SA I regularly assist other SSTs and from my point of view there is a big difference between the accessibility, information and resources provided on the Maths study sites compared to other departments equivalent sites. What is provided really does assist us in doing our job and also I feel massively helps students with prep, course choice and accessing help when needed. Making a site intuitive and user friendly is really important and I think this has been achieved here.*

*I just wish it was more obvious, need it to stop being a hidden gem!*

*It's a great resource for both students and SST staff.*

*Really impressive and will be plagiarised extensively for the Computing one in due course.*

*The Study Site is an amazing resource with a great deal of information about M&S modules, and qualifications, collected together in one place. It does much better than many OU websites in having everything (for M&S students) all together in one place, without having to scroll through reams of generic information first.*

*It gives access to a lot of valuable and useful resources. Perhaps students could be more widely encouraged to make use of it; there is so much information available now online and students may have difficulty finding some of it – or the time to access what is most important for them.*

*I think it's the best one out there (definitely the best in STEM).*

*I think the maths study site is great – out of the STEM sites I find the maths and science ones easiest to use. Especially the discover your module pages are so useful.*

*I think the maths study website is the most useful and resource filled out of all the STEM study website and other study sites should be using yours as a template.*

*Excellent resource for students and staff (seems to be much more helpful than other SST subject websites, very easy to move around and the links across sections really beneficial.*

*I like the 'hub' feel of this site. A go-to place for all M&S resources.*

### 3.7 Student feedback on face-to-face and online events

A secondary aim of the project was to elicit what type of M&S focussed events students have appreciated in the past and what, if any, types of M&S events students would like to be provided.

#### Face-to-face events

The majority of students had not attended these events, though those that had attended the M500 or MSc weekends found the events good or excellent.

	Poor			Good			Excellent			Not been to the event		
	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total
M500 revision weekend	1	0	1	1	1	2	10	1	11	19	24	43
M500 winter weekend	1	0	1	0	0	0	1	0	1	27	26	53
MSc weekend	1	0	1	4	0	4	6	2	8	19	24	43
Manchester day, 2018	1	0	1	0	0	0	0	0	0	28	26	54
MK careers day, 2015	1	0	1	0	0	0	0	0	0	28	26	54
Nottingham careers day, 2014	1	0	1	0	0	0	0	0	0	28	26	54

Table 14. If you attended any of the following face-to-face events, in the last few years, how would you rate the event?

When students were asked what face-to face-events (other than tutorials) they would like to attend most of the responses were around module choice and careers events.

*As a new student I was not aware that events like this ran, but would be interested in attend the ones like the student day or careers events.*

*Career options. Advice on what modules to do next for specific pathways. Role of statistics in research methods.*

*Maybe some module choice events where module materials are available and tutors are around to discuss. This happens at the M500 weekend but not elsewhere as far as I know.*

### 3.8 Online events

The majority of students had not participated in the online events, with the exception of the MSc briefing.

	Poor			Good			Excellent			Not been to the event		
	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total	M&S	Non M&S	Total
IMA talk	1	0	1	0	1	1	1	0	1	29	26	55
RSS talk	1	0	1	0	1	1	0	0	0	29	26	55
Careers forum	1	0	0	1	2	3	1	0	1	28	25	53
Student consultation forum	1	0	1	1	2	3	2	0	2	27	25	52
MSc briefing	1	0	1	3	1	4	9	3	12	16	23	39

Table 15. If you have participated in any of the following Mathematics and Statistics online activities how would you rate the activity?

Students would like to see a combination of short talks to help with module choice, longer talks on research and general mathematical interest topics, and careers advice for future online events.

*A 5 minute talk by each of the Module Leads would be useful to decide on the next module.*

*There was a special lecture at the end of our module given by the module team about their research that was very interesting to hear what the frontier of the knowledge looked like.*

*Lectures on interesting maths topics (recorded).*

*Live (and recorded) lectures on topics of a general and/or current mathematical nature (at the appropriate level, MSc in my case, or slightly above)*

*Again as a new student I wasn't aware of these type of events. I'd be particularly interested in attending talks about maths by institutions such as IMA and RSS in future study years.*

*Would like to see more general maths colloquia given.*

*Careers advice, Statistics society, MSc advice.*

## 4 Impact

It is unfortunate that the analytics are only available for students registered on one of the mathematics and statistics qualifications. However it was clear from the analytics available that there is a steady increase in the number of students who use the study site. Early feedback gathered in the project fed into the creation of a communication strategy to highlight the study site to all students studying the M&S modules, which took the form of a series of emails over the summer months. In September 2020 there was a noticeable jump in the number of students using the study site.

The questionnaire results show that students find all of the *Discover Your Module* resources helpful, both in terms of choosing their next module, making a head start ahead of the module presentation and updating their existing knowledge with the revise and refresh material. Ensuring students are studying a module for which they are well prepared helps with completion, retention, progression and satisfaction.

One of the main impacts of the study site is the extent to which educational and senior advisory staff in the SRSC use the site both to enhance their own knowledge about the curriculum but also directly in conversations with students. Making sure students are on the correct module and having this wrap-around support is helpful not just in terms of retention, but also in strengthening the link between the SST team and the School.

Other Schools, in particular C&C, are already using the M&S study site as a template for updating and enhancing their own study site.

## Recommendations

- The structure of the site should be improved, in particular students find the fixed main headings unhelpful.
- A site map and/or A-Z should be added to the site which is automatically updated as content is changed.
- The ability to edit the front page with links etc, may help with navigation around the site.
- The way students are routed to study sites needs to be more obvious as many students do not know these sites exist.
- An introduction to the study sites should be included in one or more of: AL inductions, ongoing AL staff development and AL CDSAs, since many ALs are unaware of the study site.
- Some form of briefing or training should be included for all SRF staff on the study sites as some advisors are unaware of the site and therefore do not point students towards the resources.
- Other schools who are currently populating their study sites should make sure SST staff are included in the development. One of the main successes of the M&S Study Site is the way SST staff (not just in M&S) constantly use the site for their own information and point students towards the resources.

## List of deliverables

1. R. Hilliam, G. Arrowsmith, A. Siddons, D. Goldrei and C. Brown 'Supporting mathematics and statistics students at a distance from beginning to end' Horizons in STEM He Conference (2020), Online (contributed talk).
2. R. Hilliam 'Providing skills through an online Mathematics and Statistics learning community' Advance HE STEM conference (2020), Manchester (contributed talk).
3. R. Hilliam, G. Arrowsmith, C. Brown, D. Goldrei and A. Siddons 'The Mathematics & Statistics Study Site: Facts, figures and further plans', eSTEEeM conference (2020), OU, (contributed talk)
4. R. Hilliam and G. Arrowsmith 'Building a study site community', OU STEM teaching conference: Celebrating our success (2020), OU, (contributed talk).
5. R. Hilliam, G. Arrowsmith, C. Brown, D. Goldrei and A. Siddons. 'Creating an online mathematics and statistics learning community' Royal Statistical Society Conference, (2019), Belfast (Poster)
6. R. Hilliam, G. Arrowsmith, A. Siddons, D. Goldrei and C. Brown 'The mathematics and statistics community of learners' eSTEEeM conference (2019), The Open University (poster)
7. Blog post: Advance HEA., 25/03/2020 <https://www.advance-he.ac.uk/news-and-views/online-student-experience-more-learning-online>

Plus aiming for conference presentation and written paper in 2021.

## Figures and tables

Figure 1. Number of unique monthly visits to the M&S study site from September 2017 until September 2020

Figure 2. Total number of monthly visits to the M&S study site from September 2017 until September 2020

Figure 3. Unique and total number of monthly visits to the M&S study site from September 2017 until September 2020

Figure 4. Unique daily visits to the M&S study site between 17<sup>th</sup> September 2017 and 30<sup>th</sup> September 2020

Figure 5. Bar chart showing how students were made aware of the site

Figure 6. Bar chart using how students use the Study Site

Figure 7. Bar charts showing how frequently students use the forums

Figure 8. Bar chart showing how students rate the AYRF resources

Figure 9. Bar chart showing the type of modules tutored by AL respondents

Figure 10. Bar chart using the job role of the SRSC respondents

Table 1. Descriptive statistics for the unique and total number of monthly visits to the M&S study site from September 2017 until September 2020

Table 2. Respondents study goals

Table 3. Student: Have you used the M&S Study Site?

Table 4. Student: If you have not used the M&S study site, please state why not.

Table 5. Student: How were you made aware of the site? Choose as many options as apply.

Table 6. Student: How do you use the study site?

Table 7. Student: How useful are the following resources?

Table 8 Student: How do you describe the way in which you use the forums?

Table 9. Student: How would you rate each of the following resources on the *Discover Your Module* pages?

Table 10. Staff: Have you used the M&S Study Site?

Table 11. Staff: Why do you use the site?

Table 12. Staff: Why have you not used the M&S Study Site?

Table 13. Staff: How would you rate each of the following resources for use by you or your students?

Table 14. If you attended any of the following face-to-face events, in the last few years, how would you rate the event?

Table 15. If you have participated in any of the following Mathematics and Statistics online activities how would you rate the activity?



## References

- C. Calvert and R. Hilliam (2018) 'Student feedback to improved retention: using a mixed-methods approach to extend specific feedback to a generalisable concept' *The Journal of Open and Distance Learning*, 34(1), 103-117.
- C. Calvert, R. Hilliam and J. Coleman (2016) 'Improving retention for all students, studying mathematics as part of their chosen qualification, by using a voluntary diagnostic quiz.' *MSOR Connections*, Vol 14(3), 28-31.
- R. Hilliam and G. Arrowsmith (2019) 'Enhancing the student experience with the use of a dedicated subject website' *MSOR Connections*, Vol 17(2), 39-45.
- R. Hilliam and D. Goldrei (2019) 'Creating an online mathematics and statistics community of learners' *New Directions in the Teaching of Physical Sciences*, Vol 14(1).
- S. Pawley and C. Hughes (2018) 'Bridging the study gap: Provision of support for mathematics students during breaks in study' *New Directions in the Teaching of Physical Sciences*, 13(1).

## University approval processes

SRPP/SSPP – Approval from the Student Research Project Panel/Staff Survey Project Panel was obtained according to the Open University's code of practice and procedures before embarking on this project. Application number 2020/031.

Ethical review – An ethical review was obtained according to the Open University's code of practice and procedures before embarking on this project. Reference number HREC/3531/Hilliam

Data Protection Impact Assessment/Compliance Check – A Data Protection Impact Assessment/Compliance Check was obtained according to the Open University's code of practice and procedures before embarking on this project. Data Protection registration number 28-04-29.