

Effective Learning Advice Service  
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**Brunel**  
UNIVERSITY  
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# Internal Evaluation Report

## **Maths Cafe**

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# 1. Introduction

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The Maths Café is an initiative that was implemented by Brunel University for the second time. The idea of running a two-week Maths Café was based on a model that is used at the University of Portsmouth (2008), where maths drop-ins run on a daily basis, throughout the year for two hours in the Student Union coffee shop. Brunel University runs a drop-in service 6 hours per day for two weeks over the revision period to provide tutorial assistance to any student urgently needing help as the examination period approaches. One-to-one support was provided, but also paper- and computer-based resources were also available.

This project ran partly as a study to identify the main mathematical issues students needed help with and equally important, to identify what courses these students were studying. This information could be used to design a more integrated approach to support students in subsequent academic years. This evaluation reports on our experiences of running the café, provides details of the students who were attracted to the café and records students' perceptions.

## 2. Running the Maths Café

### 2.1 The set-up of the café

The location of the café was important and needed to be situated somewhere central and visible to students. The Learning and Teaching Development Unit (LTDU) used the financial support of the LearnHigher Centre of Excellence in Teaching and Learning (CETL) ([www.learnhigher.ac.uk](http://www.learnhigher.ac.uk)) to set up a room that could be used by students as a learning space. The room at Brunel University (referred to as the LearnHigher Centre) is situated at the front of the Lecture Centre; two of the walls of this room are glass, so that people walking past can look into the room. The location and visibility made this an ideal room to use. Its seating capacity, with tables, is 20 and standing capacity, with no chairs or tables, is 50; i.e. it is a small



**Figure 1: The LearnHigher room dressed up in a café style**

teaching room. To keep with the café theme, the room was provided with tables covered with

chequered red and white table cloths, and flowers were placed on all tables (see Figure 1). Free coffee, tea and snacks were available during the opening hours. The tea and coffee were ordered in-house via the catering service, but all the snacks were ordered online from a supermarket chain, as a more cost effective option.

Although 20 laptops are available for use in the LearnHigher Centre previous experience showed that students would be mainly using one-to-one support with paper-based resources (such as lecture notes and textbooks); hence, only four laptops were set out for students to access online learning resources. This proved to be adequate. The paper-based resources provided were a combination of materials written by the maths support tutor at Brunel University (who works as part of the Effective Learning Advice Service (ELAS)) and from the nationally available Mathcentre ([www.mathcentre.ac.uk](http://www.mathcentre.ac.uk)).

These paper-based resources were situated near the door, the idea being that students would be drawn to the freely-available resources (see Figure 2). They covered a wide range of topics. Initially fifty copies of each resource were made available, since the twenty copies last year was not enough.



**Figure 2: Students accessing the paper-based resources, which were displayed by the entrance to the room**

The opening hours of the café were from 10am – 4pm, Monday to Friday. The café ran for the one-week revision period from Monday 27th April and the one week in the examination period, from Tuesday 5<sup>th</sup> May. In total, six members of academic staff were involved in running of the café. Four of the members, Dr Martin Greenhow, Dr John Newby, Dr Inna Namestnikova and Dr Claire Lines have vast experience of teaching for undergraduate mathematicians and non-mathematicians. The other members of the team, Ms Christine Gregory and Mrs. Sarah Summerbell are also experienced in maths teaching on different levels. A timetable was set up so that at all times during the opening hours at least 2 members of staff were present.

## 2.2 Advertising the café

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Advertising the café started a month before the event to inform both students and staff. Different strands of advertising were used to promote the event to as many students as possible.

- ❖ All lecturers teaching foundation and Level 1 mathematics modules were informed via email about the project. They were sent all the details of the café (i.e. dates it was running, opening times and location) so that they could pass the information to their students.
- ❖ An email advertising the café was also sent out to all students who had received maths support via the ELAS before.
- ❖ Leaflets and a poster were designed and sent to the university's print room for bulk printing (see Appendix 1) and distributed to all central services (Student Services, Student Union, Library, Counseling Service, Placement and Careers Centre, Disability and Dyslexia Service) and to key Schools within the university that teach a large number of quantitative modules namely, the School of Engineering and Design and the School of Information Systems, Computing and Mathematics.
- ❖ A web page advertising the café was also developed. It was hosted on the ELAS website on the university's intranet.
- ❖ A banner advertising the café (linked to the webpage) was loaded onto the university's virtual learning environment (VLE). This meant that anyone logging into the VLE would see the message advertising the café.
- ❖ The event was also advertised via various plasma screens that are distributed around the campus.
- ❖ Several signs were put up on the glass window of the LearnHigher Centre (see Fig. 1).

## 2.3 Recommendations

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In spite of that, this project was running for the second time at Brunel University and it was still a learning process for everybody involved. Nevertheless, our recommendations are to note the following points for future cafes:

- ❖ Email and web advertising paid a great role in the whole advertising process.
- ❖ Our experience of both years shows that the location and visibility of the room used was pivotal to the success of the cafe (see section 3). Although many strands of advertising were used to promote the café, which helped to create the initial “buzz”, a major catalyst

was the fact that students were able to see the activities taking place in the LearnHigher Centre from outside and were able to walk straight in to find out more. From walking past the room, it could clearly be seen that the room was set up differently (with the look and feel of a café) and that it was student-focused.

- ❖ The paper-based resources that were placed by the door also helped to pull students in. Initially, fifty copies of each resource were made. This was a sufficient amount. However, it seems to be necessary to extend the number of covered topics. Certainly there are few leaflets covering statistics, probability, linear algebra and financial. Students prefer to work through short 1-2 pages leaflets focused on key ideas only.
- ❖ The maintenance of the café, communicating with the students wishing to get the tutor's assistance, responding to student's general enquiries, maintaining records and collecting data for the Evaluation Report via evaluation forms, copying reference materials and handouts etc during the two-week period was done by a postgraduate student helper who was employed full time in the café. In future, and for other such projects, this should continue.

## 3. Evaluation of the Café

### 3.1 Evaluation Process

The Maths Café was evaluated to identify which students were accessing the support available and what topics/areas of mathematics they had problems with. To capture this data, students were given a self-registration/evaluation form (see Appendix 2) to complete before they saw a tutor. They were reminded to place their forms in a closed box in the room (in order to keep anonymity) after they had seen a tutor. To increase the rate of return of the forms a shorter evaluation form was given to returning students who had previously completed the longer form (see Appendix 2). This new form simply asked students their name, mathematics problem and the three feedback questions.

The small return rate of the evaluation forms seems to be still a problem. Only 111 long and 54 short evaluations forms were returned during the whole period. This is only 51% of the whole number of student's visits (325).

The evaluation form asked students to state their:

- Name;
- Gender;
- Student number;
- Email address;
- Previous maths grade (at GCSE and A-level, if applicable);
- Academic School;
- Course;
- Level of study.

Additionally, students were asked to state/describe the mathematics problem they needed help with. This was done to encourage students to think and be clear about the problem(s) they were having, rather than asking for help with a complete topic or even just saying that they "need help!" The second half of the evaluation form asked students to give feedback about the service received. This was kept short so that students would not have to spend too much time on this aspect of the evaluation. They were asked three simple questions:

- How useful they found the advice/support given;

- How the café could be improved;
- Any other comments.

The collected evaluation forms provided some useful information about the students who received one-to-one support. The results are presented below. Like in the previous year, some students accessed the café to make use of the room as a learning space, working with peers to help each other and work together (see Appendix 3 which shows photographs of how students used the LearnHigher Centre as a learning space).

Many students wanted to work on their own (or in small groups) in the room since they knew there was help on hand if they needed it.

## 3.2 Results

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The results obtained from the evaluation forms will be analysed in three sub-sections:

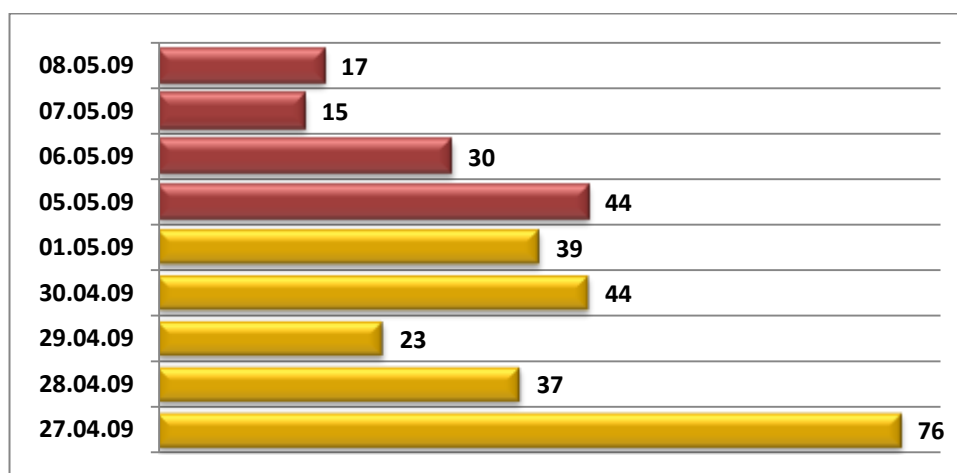
- Demographics of students accessing the café;
- Topic areas students required support with;
- Feedback received from students about the café.

Results from first two sub-sections should help us plan for more structured support to be offered to students in the next academic year. The third sub-section will report on what students thought about the initiative; this will be used to make recommendations for future Maths Cafés and other similar initiatives.

### 3.21 Student Demographics

Using the data collected from the tallies maintained by the student helper, it has been estimated that approximately 325 visits made by students received some support during the nine-day period. Fig.3 includes students who received one-to-one support, or came to the café to access the paper-and web-based resources, or those students who made use of the café as a learning space.

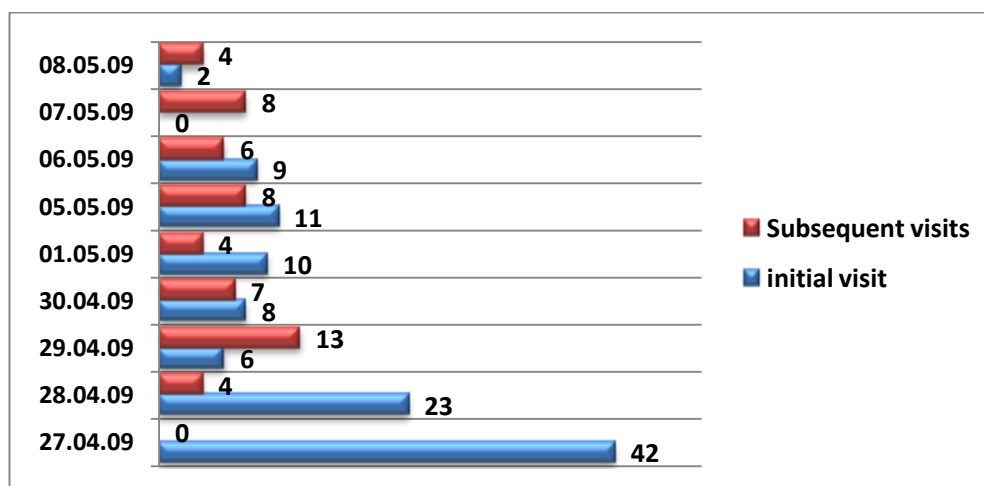
Figures for the current year 2008/09 can be compared with those for 2007/08, in brackets: duration 9 (10) days, 325 (352) visits, 165/51% (198/56%) returned an evaluation forms, 36 (35) visits per day as average.



**Figure 3: Number of students visiting the cafe on different days**

The figures for the first day (Monday, 27th) are higher than for the other days and the revision week was very busy one. What is apparent from Figure 3 is that students made use of the café every day over the two-week period. There is no one day where it might be suggested that the café may not have been worthwhile running. Note: a sizable cohort, level 1 Economics, had maths and stats exams on 06.05.09, and hence did not attend subsequently. This partly accounts for lower numbers on the two final days. Of course, when planning the café, dates of exams were not yet known.

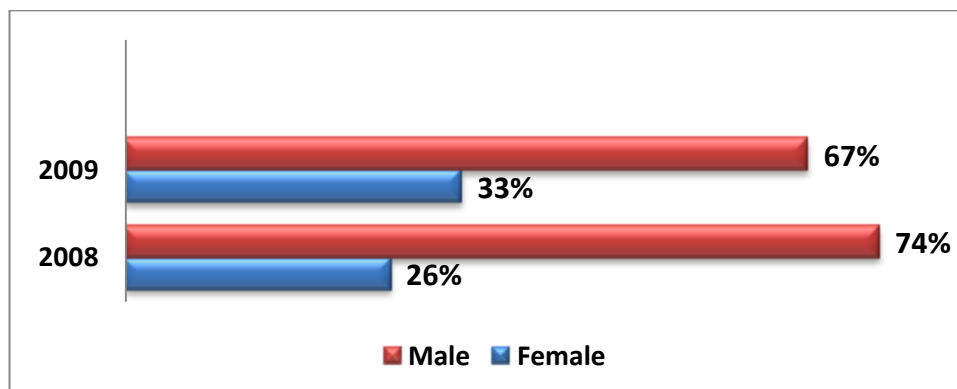
Fig. 4 shows the data received from evaluation forms, comprising only students who received one-to-one support.



**Figure 4. Number of students who received one-to-one support each day throughout the duration of the café**

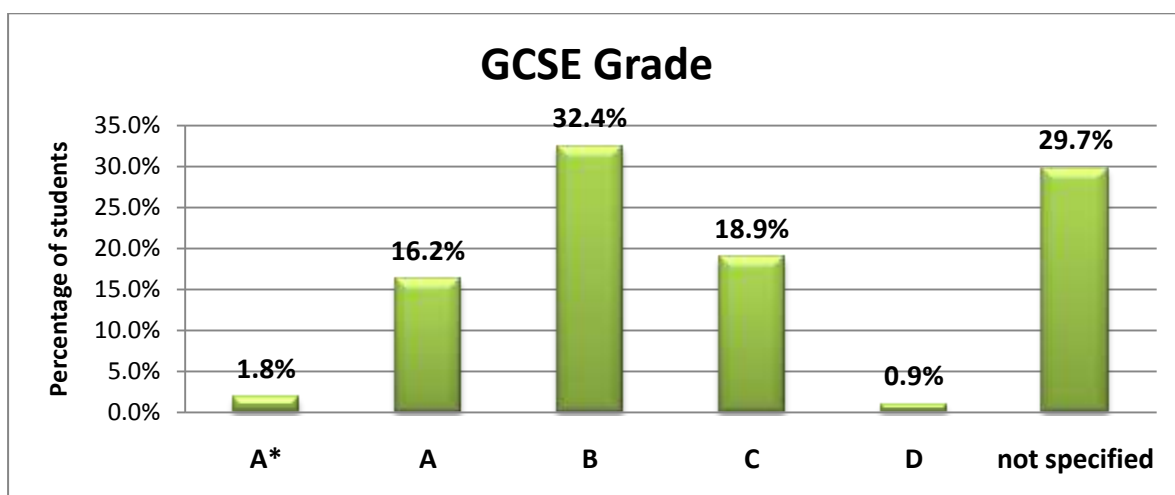
The data collected from the long evaluation forms shows that for the both years there was a higher percentage of male students accessing the café (see Figure 5). During the current

academic year, the equal number male and female students attended ELAS drop-one-to-one sessions. This may indicate that male students prefer to get maths support closer to exam period rather than through the academic year.



**Figure 5. Distribution of students in terms of gender**

One of the aims of the café was to support non-traditional students, and those students who are enrolled on quantitative modules but have not completed A-level in mathematics. It was therefore important to find out students' GCSE and A-level mathematics grade, if applicable. Out of the 111 students who completed the evaluation form, only 92 students disclosed their previous exam results. 7 students did not specify the achieved grade and 26 did not confirm that they even completed GCSE. Figures 6 and 7 illustrate students' previous grades in GCSE and AS/A-level mathematics, respectively.



**Figure 6. Distribution of students in terms of the GCSE mathematics grades**

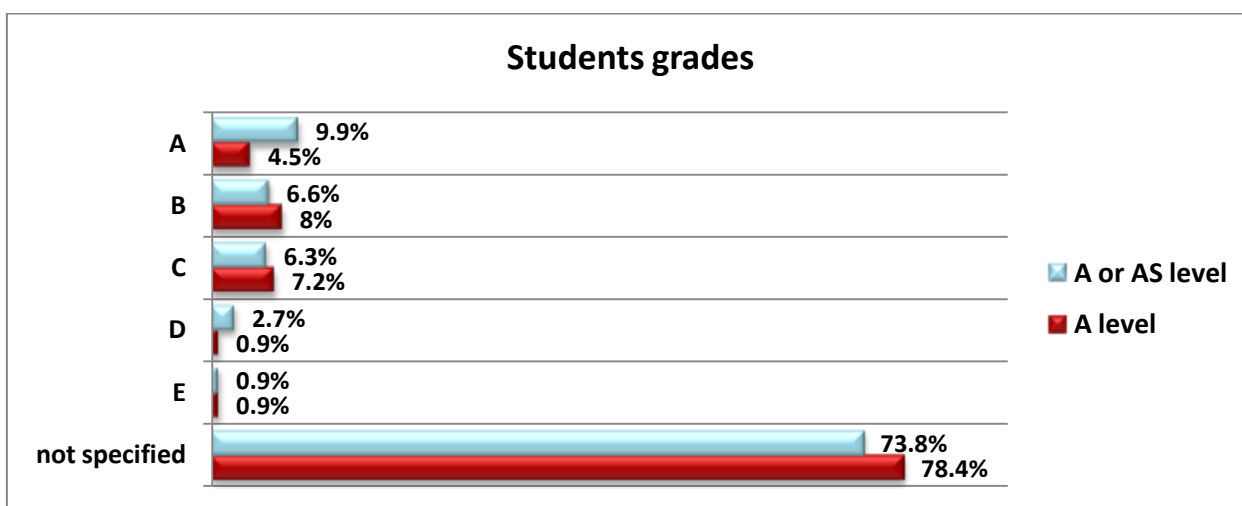


Figure 7. Distribution of students in terms of the completed AS and A levels.

From Figure 6 it can be seen that students' GCSE grades majority of students achieved grade B, with a small percentage achieving an A\*. Figure 7 indicates that many of the students who accessed the café had not done or did not specified an AS-or A-level in mathematics (73.8% and 78.4% respectively). Students clearly needed support in bridging the gap between GCSE mathematics and university undergraduate mathematics.

Topic areas students needed assistance with, may depend on their academic school (or department). Figures 8 and 9 show the distribution of students by Schools and by level of study respectively.

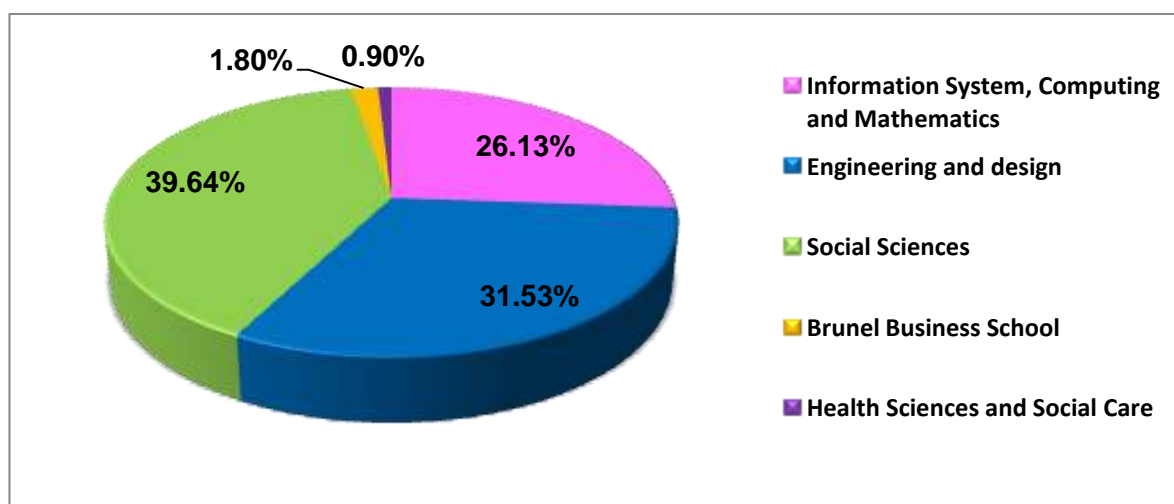


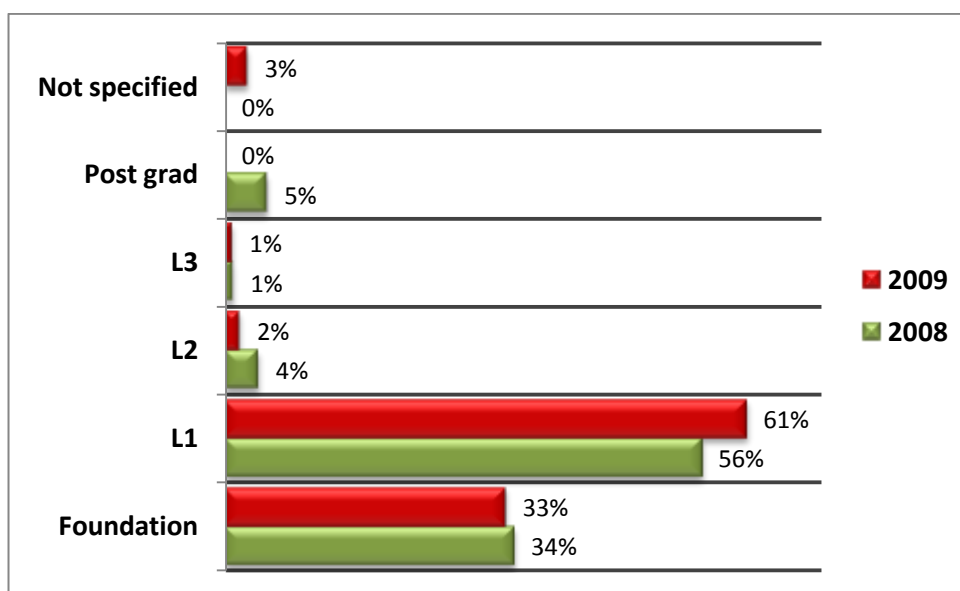
Figure 8. The distribution of students by Academic School.

Figure 8 shows that students were mainly from three Schools (out of eight). These Schools were the ones where it would be expected that students are studying quantitative modules. A very small minority of students were from the School of Health Sciences and Social Care and Brunel Business School, which may indicate that students had a need for maths support, but not many took advantage of the support available. It may have been that students from this

School had not been targeted as well as the three other Schools so, for future initiatives, more direct publicity may be required (see section 4 for future recommendations).

This year the Maths Café was advertised as being for foundation and first year students (see Appendix 1). It was done because the needs of students on higher levels were more specific to their disciplines and so it was difficult for the tutors to support them, although as much help as possible was given. Above over, a lot of time was spent with these students in an attempt to understand their problems and it was felt this time should have been spent with the target group, especially at peak times (see section 4 for future recommendations).

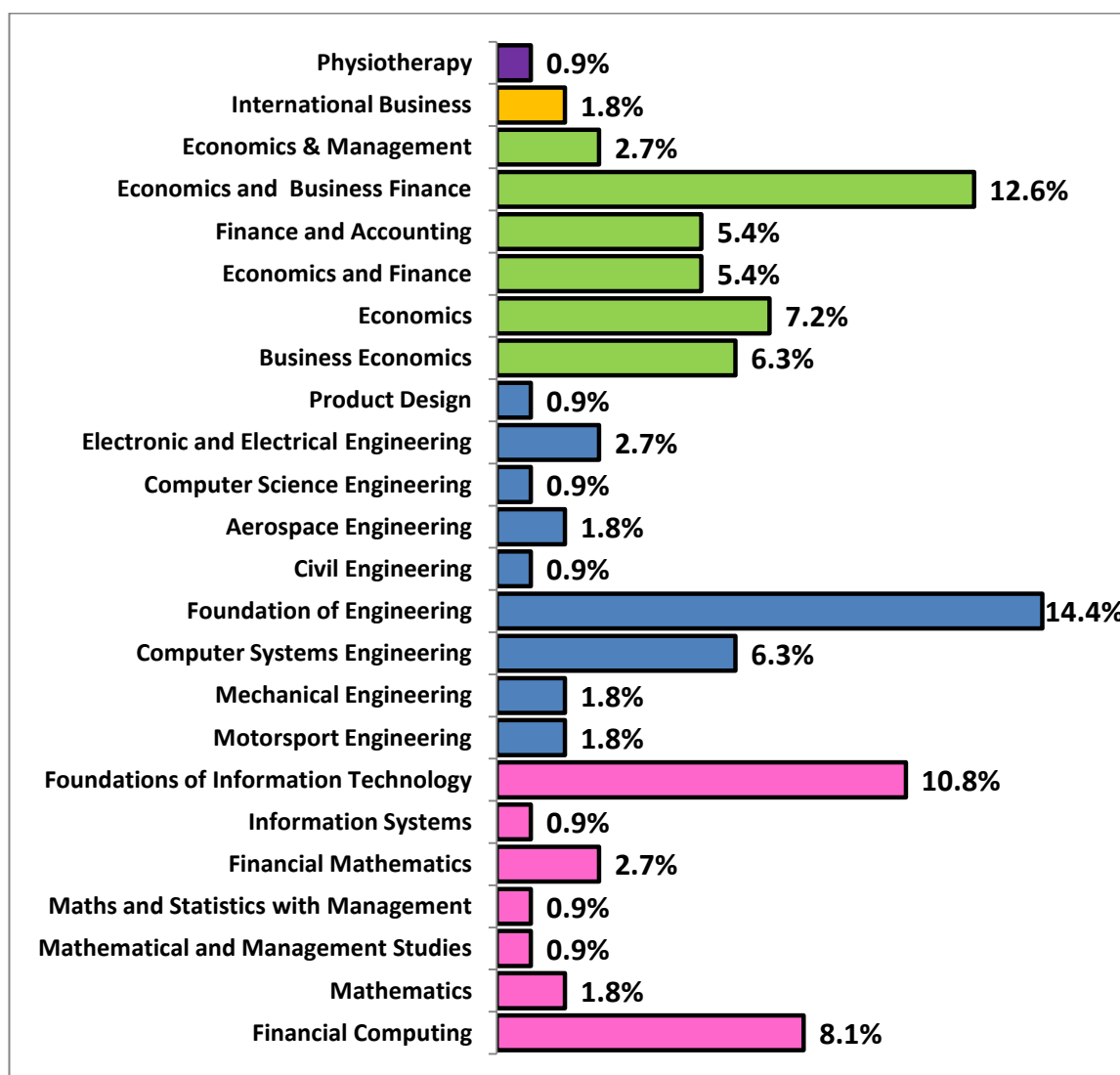
Consequently, the majority of students who accessed the café were from foundation level and level 1. In terms of improving retention, these students were the target groups; the café was set up and advertised in a way that encouraged students from these groups to access the support provided.



**Figure 9. Distribution of students by level of study.**

As well as knowing the Academic School and level, it is also useful to know which course students were enrolled on. This information may enable more structured mechanisms of support to be integrated into the different course in subsequent academic years.

Figure 10 shows the distribution of students by Academic School and course (we keep the same colour for each school, which used in Fig. 8).



**Figure 10. The distribution of students by Academic School and Course.**

From Figure 10 it can be seen that the majority of students who utilised the Maths Café from the **School of Social Sciences** were enrolled on a course which was a strand of Economics; for example, Economics and Business Finance, Economics and Business Economics. Although the courses on which students were enrolled were different, the core quantitative module was common to all of them - Mathematics for Economics. Compared with the previous year, the share of students who looked for maths support from this school is almost doubled (39.64% against 23% for the last year).

The **School of Engineering and Design** has a broader range of courses, which involve different mathematical aspects. The range of courses became more representative this year e.g. some Electronic and Electrical Engineering students also asked for the help. However, the Foundations of Engineering programme was still the group from which students were accessing maths support. This is a foundation level programme in which students need to achieve an average of 55% to progress to a course in Design, or 50% to progress onto a Bachelor of

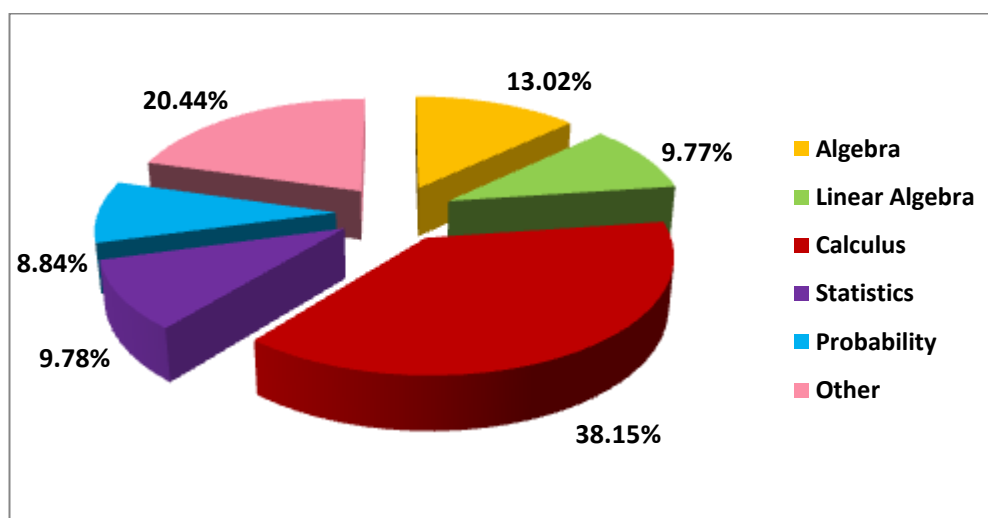
Engineering course. Hence, students need to pass their examinations (achieving at least 50%) to progress into level 1. Considering that a high percentage of students enrolled on the Foundations of Engineering programme have only got 160/180 A-level points and may not have studied maths at As or A-level, they needed support to build confidence and fill knowledge gaps in mathematics. This is clearly indicated by the large number of students who accessed the café from this programme. Ideally, this support should have been accessed throughout the academic year by the students; one-to-one support was available all year round, but many students chose not to use it or did not know about it.

It should be pointed out that the share of students who accessed the café for one-to-one support were from the **School of Information Systems, Computing and Mathematics** dropped this year, being only 26.13% (against approximately 46% the last year). Similar to the last year, the majority of students from this School were from Financial Computing and Foundations of Information Technology. These students clearly needed support to fill knowledge gaps and build confidence in the lead up to the exams. The entry requirements differ considerably, being 260 A-level points for the Financial Computing course and 160 A-level points for the foundation programme. However, AS-or A-level mathematics was not a requirement for either.

Summarising the above, it should be pointed out that the data presented in Figure 10 indicates that for future academic years more integrated support mechanisms need to be incorporated across three Schools, and six course or programmes: Economics and Business Finance, Economics, Business Economics, Foundations of Engineering, Financial Computing and Foundations of Information Technology. This is not to say that students from other Schools do not require mathematics support, but that these six courses are ones where students are enrolled in quantitative modules that may be above their current capabilities and they may need more guidance and support to overcome particular difficulties.

### *3.22 Topic areas students required support with*

In addition to knowing which courses students were from, it was also important to identify what topic area students needed help with. Students were asked to state this on the long and short evaluation forms. 216 answers were given in 165 evaluation forms. In total, students requested help with about 42 topics, which have been grouped into 6 categories in Figure 11 (see Fig. 13 for the complete data).

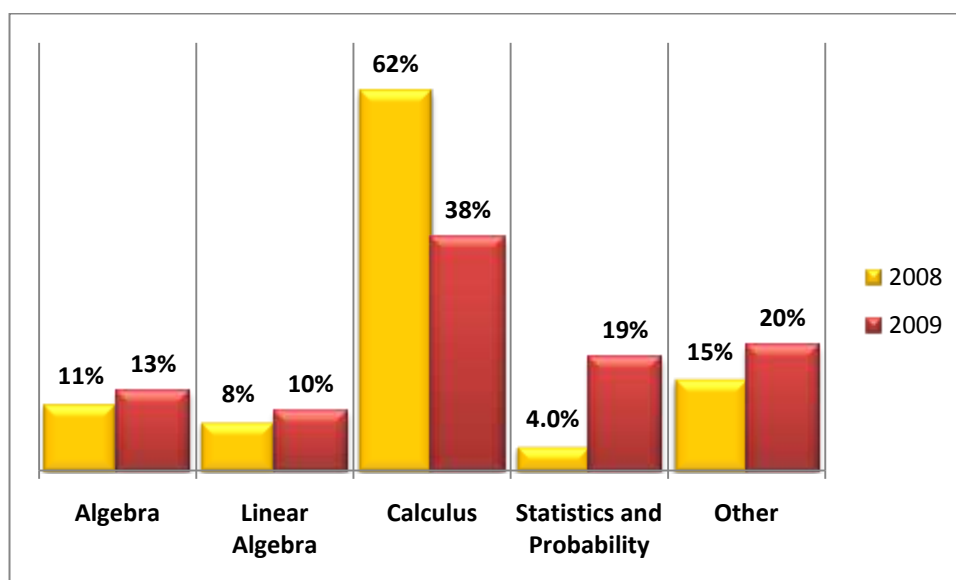


**Fig. 11. The distribution of students by requested topics**

Four out of the six categories that students required help with clearly state the strand of mathematics. The “other” category covers topics that fell outside of these four strands, for example, Graph Theory or other areas of Discrete Mathematics. This year a lot of questions were about past exam papers. Sometimes students asked a particular question but in reality, they wanted help with the previous exam paper questions. From Figure 11 it can be seen that only 38.2% of students stated that they needed help with Calculus (this is less than last year). Probably this is the result successfully running workshop programme during the academic year, which included 8 workshops devoted to Calculus. The majority of questions during the drop-in sessions throughout the past year were also about Calculus.

However, their difficulties, most often resulted from poor competence with basic Algebra (for example, the rules of indices). In most cases, students could apply the basic rules of differentiation and integration but were unable to handle the algebraic manipulation needed to simplify their answers. Figure 11 also indicates that by the revision period, most students feel they are confident with the algebra aspect of their module, since only 13% of students requested help with this particular area. However, it could mean that students are “less interested” in the basics of their course (i.e. the algebra aspect of their module) and focus most of their revision on the more difficult aspects of the module. This is a suggested interpretation of our experience in the Maths Café. Students’ examination scripts could be analysed to identify whether or not this is the case. Alternatively, this could indicate that more time needs to be allocated within the module to focus on Calculus so that students have time to build knowledge and confidence with this topic area.

It should be said that the number of students who sought the help in statistics (10%) and probability (9%) increased this year (see Fig. 12), although the majority of students (61%) still required help with mathematical methods (calculus, algebra and linear algebra).



**Fig. 12. Percentage of the students who needed help by topic area**

This year at least one of the tutors specialised in teaching statistics, but there is still a need to more broad support students with statistics and probability in the future (see section 4).

In Fig.13 the requested topics are presented in more detailed. The colour for each category is similar to Fig. 11. When students did not indicate a particular topic but just wrote e.g. “Calculus” (or even “SOS!”) this answer was added to the category “general”. According to this chart the most popular questions were integration, differentiation, discrete maths and questions on past exam papers.

The next three figures show the similar charts for each of the three major academic schools. By analysing the topics that the students asked, one can get insight into the type of support that could/should be integrated into modules over the next academic year.

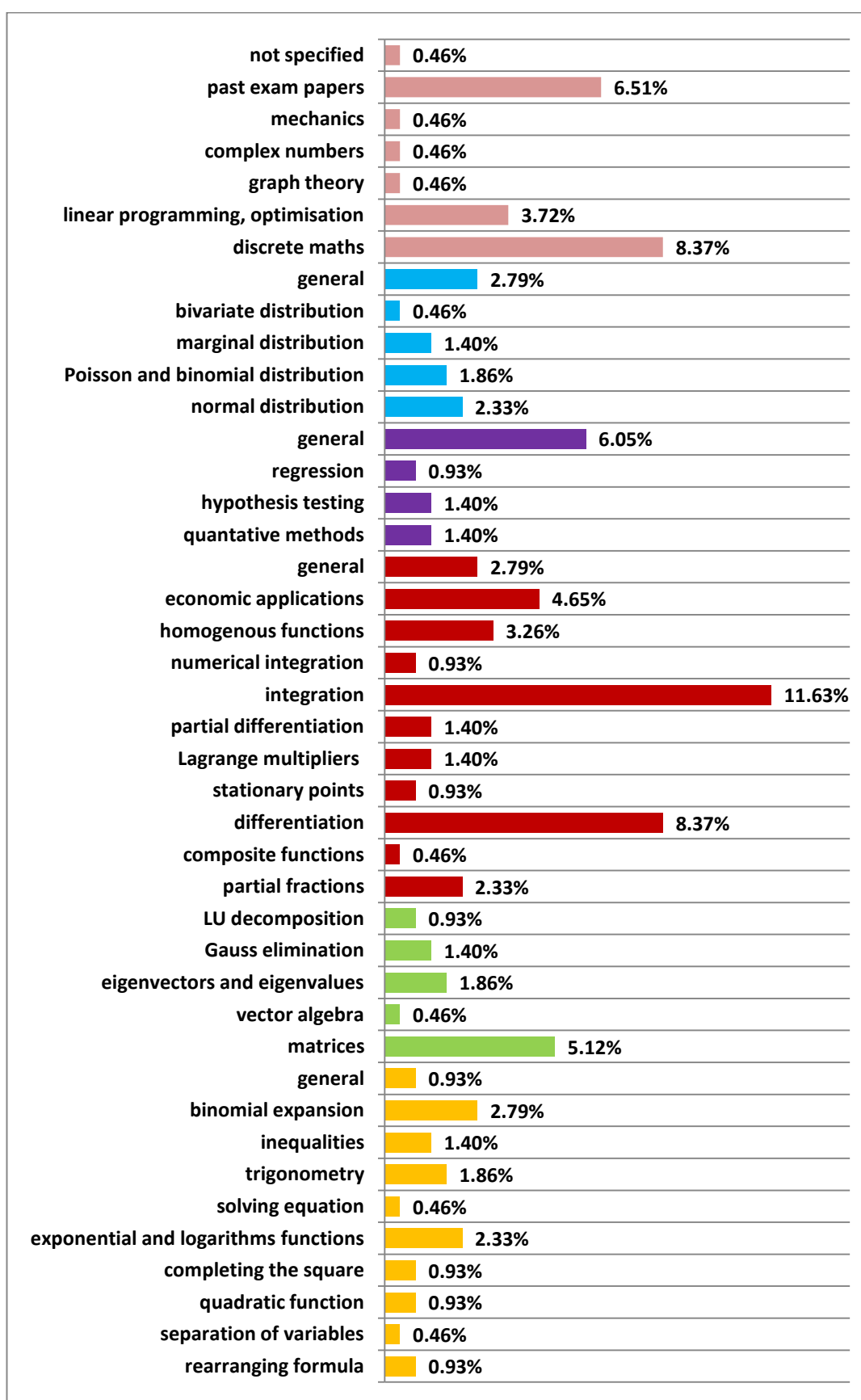
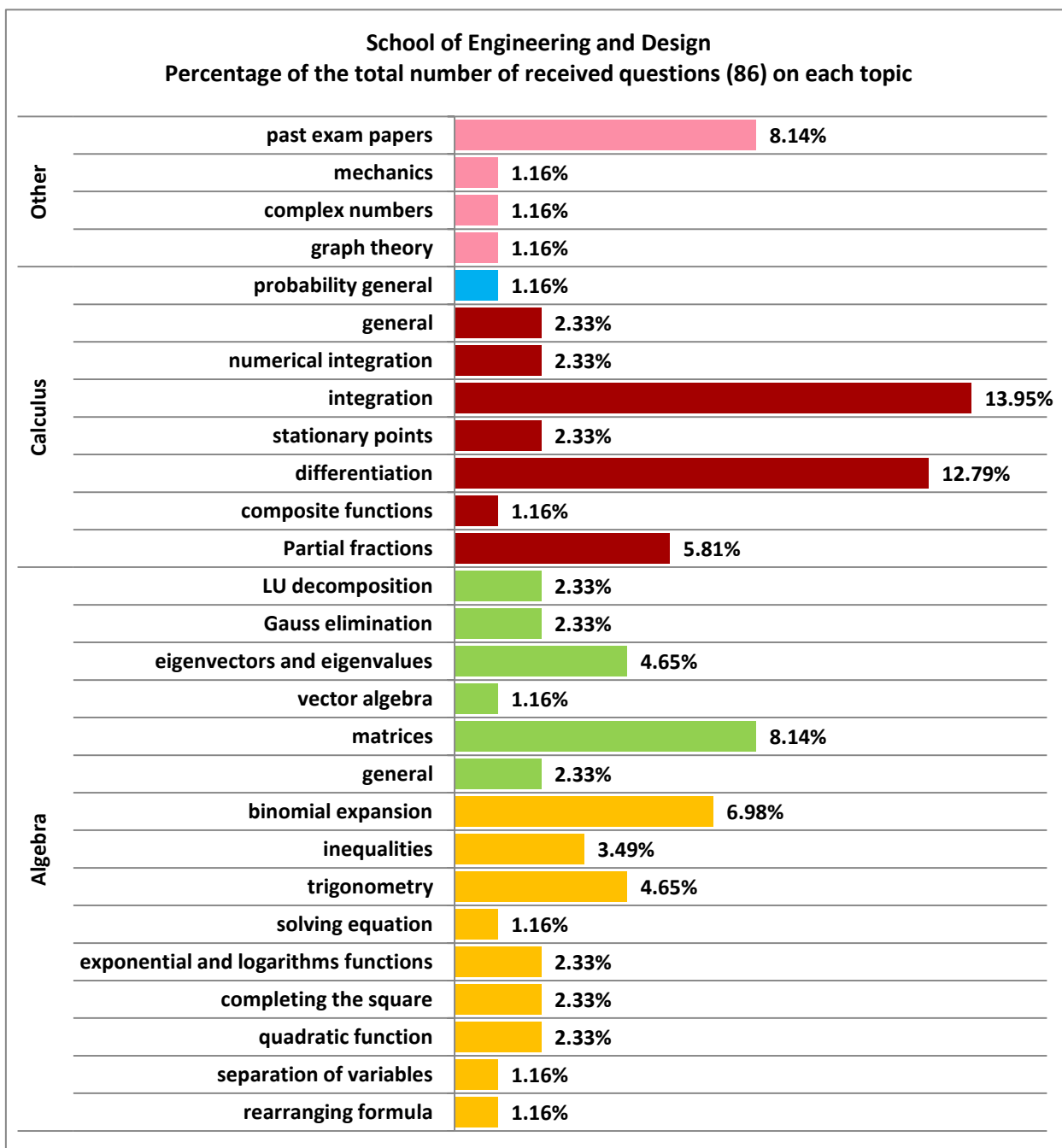
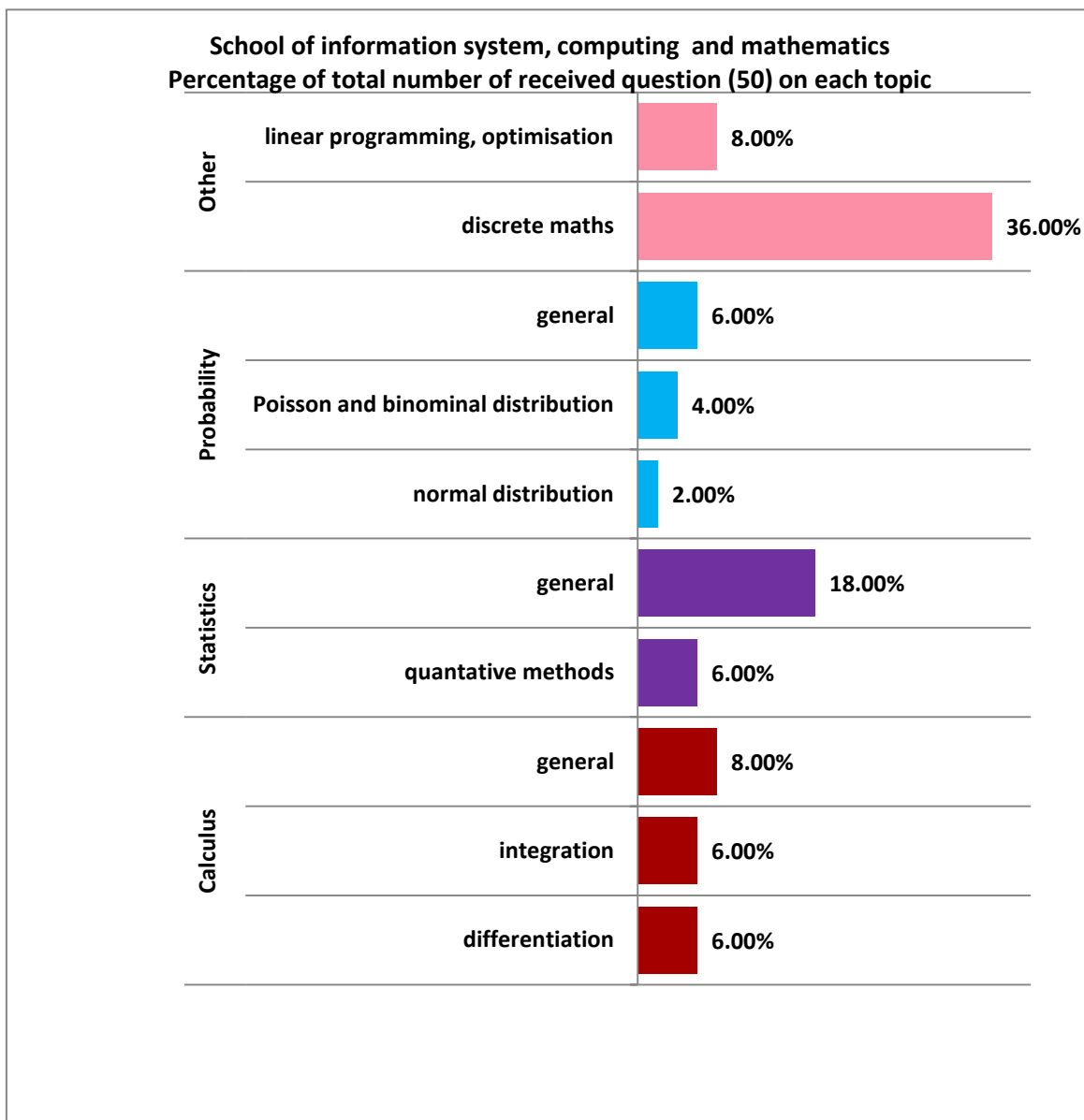


Fig. 13. The distribution of students by requested topics (percentage from the total number 216)

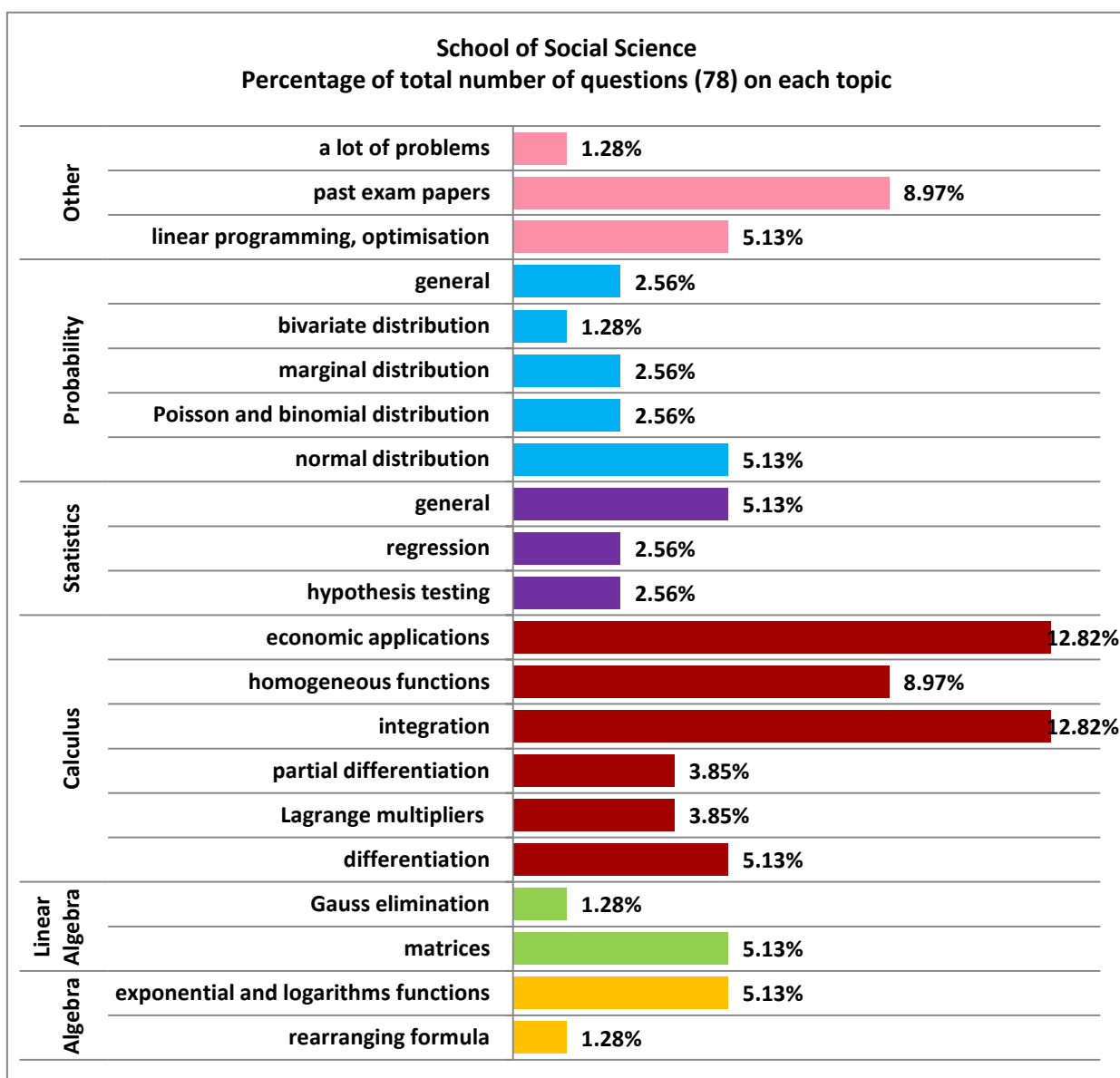
The students from School of Engineering and Design asked for help in a broad range of topics. The main questions were about integration, differentiation, matrices and past exam papers.



The students of Information System, Computing and Mathematics mainly concentrated on discrete mathematics, linear programming and statistics problems.



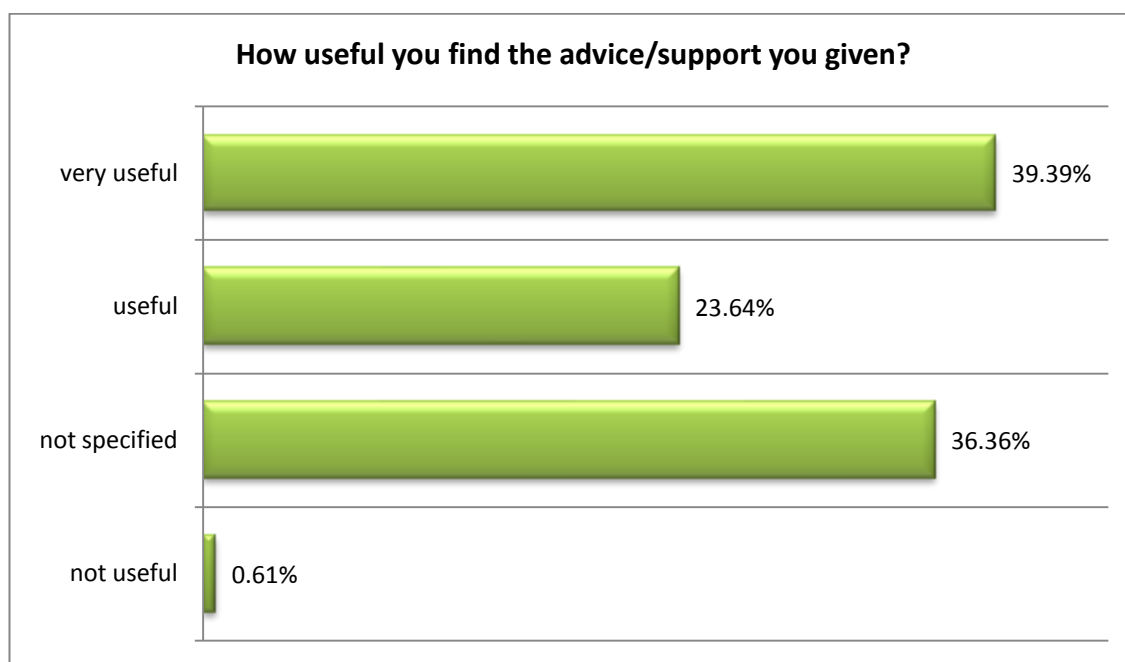
For students from School of social science integration, economic applications, homogeneous functions and past exam papers questions were the most popular topics.



### 3.23 Feedback received from students

Not only was it important to collect information to identify the student demographics, but it was also important to collect feedback from students. The feedback collected from the evaluation forms was kept brief but general, so that students could make comments and suggestions for any improvements. To identify whether students found the support provided via the one-to-one tutoring useful, they were asked to complete a Likert scale question (see Appendix 2). The results, shown in Figure 14, indicate that a large proportion of students found the support and advice given very useful (39.4%) or useful (23.6%). Very few students said they found the advice not useful (0.6%). This shows that students found the one-to-one nature of the café useful and indicates that the tutors were able to provide effective assistance with the wide

range of topics.



**Fig. 14. Feedback results**

As part of the evaluation of the café, students were asked how they thought the café could have been improved. Out of 165 students that completed the evaluation form, 28% (46) made at least one suggestion for improvement. 44% of responders thought it could be improved by having more tutors present. Although there were two tutors present at all time, quite frequently over the nine-day period the room was filled to maximum capacity, which meant that all chairs and table spaces were occupied and there was very little standing room available. Hence students had to wait for a short period of time before they had a discussion with a tutor. Exact waiting times were not recorded. When the café was at maximum capacity, tutors kept to a 20 minute limit per student so that more students could be helped and so that students were not waiting for an excessive amount of time. This was a reasonable adjustment to make and worked well. Whether or not the number of tutors can be increased depends on the funding available.

Another suggestion that many students (17%) made was that they wanted the duration and opening times of the café extended. The café was open from 10am – 4pm, for 9 days. One of the concerns with running the café over the examination period is that we do not want to encourage students to leave their revision until the very last moment before the exams start. Additionally, students could still have made use of the normal one-to-one service that is provided by the ELAS for help with Mathematics, Statistics and Numeracy throughout the year. It is anticipated that experience of receiving effective one-to-one tutoring through the Maths Café will encourage the students to seek it in ELAS when they realise they are having

difficulties. For extended opening hours, we would need more finance and more tutors, since the six tutors were stretched with the hours and days they worked over the nine-day period.

There were no comments about the food available this year. A very small minority of students (2%) stated that they would have preferred the tutors to have subject-specific knowledge. This comment was only made by students from the economics course, where the mathematics terminology is slightly different to that used in mathematics and engineering. However, for the most part, this was not an issue for either staff or students.

All the suggestions made by students were positive and are feasible to implement, e.g. extended opening hours. However, would depend on more funding being available.

The last part of the student evaluation was to ask students for any other comments they had about the Maths Café. Verbatim examples of some these comments are

- ✚ “Thank you very much for all of your support and giving us chance to access to qualified teaches and the other supports”
- ✚ ”Very helpful and polite”
- ✚ “It is perfect, beautiful! Well done...Bravo”
- ✚ “I like the help given from prof / lecturer. They are nice, pleased to give advice.”

## 4. Conclusion and recommendations

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As for last year, the Maths Café was very successful. It provided a good opportunity for students to receive one-to-one support from experienced staff and get access to the paper- and web-based resources during the last revision week and the first week of the exam period. Some students used the café as a learning space and worked on their own (or in small groups) since they knew there was help on hand if they needed it.

The received feedback indicates that the café and the tutors involved promoted an environment that was friendly and open where students were not afraid to disclose what they did not know or understand. Students also appreciated the support and help that were given and found it useful and sufficient. This indicates that the Maths Café met the needs of the students and should be run in the future.

Given more funding, it would make sense to increase the number of tutors available. Keeping in mind the growing demand for help in statistics and probability, it seems to be necessary have a statistician available on call at any time during the open hours, as well as staffing the café during (advertised) hours.

It would be better if the tutors involved in future Maths Café for had solutions of exam papers and solutions from the previous years. This would allow them to answer the student questions more quickly, to use the terminology, that is familiar to students, and give the solutions in a form required for each particular module.

All tutors agreed that the organization of the whole event was better this year particularly because of the presence of the student helper what allowed them to concentrate on tutoring. Having such a helper should continue.

It turns out that the students from School of Sport and Education were not able to attend the Maths Café because most of them were on their placements in schools. Probably a more suitable time for the Maths Café can be found for these students.

The information received from the report should allow us to construct a more effective and useful ELAS workshop programme throughout the academic year by including topics which were the most popular at this year's café.

## Appendix 1

Leaflets that were distributed to promote the Maths Café



 **Maths Café** 

Bring along your Maths questions/problems and receive free one-to-one help in an informal and friendly environment.

-  Any foundation or first year student, any course
-  Paper based resources and online material available
-  Tea, coffee and snacks available free of charge

Dates: Monday 27<sup>th</sup> April – Friday 1<sup>st</sup> May  
Tuesday 5<sup>th</sup> May – Friday 8<sup>th</sup> May

Time: 10am - 4pm

Location: LearnHigher Centre, LC003

**Brunel**  
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Effective Learning Advice Service  
Tel 01895 266547

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## Appendix 2

Evaluation forms that were used to collect student information

### Evaluation Form

The information collected in this evaluation will be kept strictly confidential and no information will be passed to any Schools or course leaders.

### About you

Name:						
Gender:	Male			Female		
Student Number:						
Brunel Email Address:						
Previous Maths Grade	GCSE:		AS:		A Level:	

School (circle one):

Arts	Business	Law	Eng & Design	Health Sciences and Social Care	ISCM	Social Sciences	Sport & Education
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Level: Foundation L1 L2 L3 PG

Please state your course  
(e.g. economics)

Please state/describe the maths problem you would like help with

### Feed back about us

How useful did you find the advice/support given: (please circle one)

<b>Very useful</b>	<b>Useful</b>	<b>undecided</b>	<b>Not useful</b>	<b>Not very useful</b>
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How could the café be improved?

Any other comments

Shorter form that was used with returning students

**Evaluation Form**

Name:

Please state/describe the maths problem you would like help with

**Feed back about us**

How useful did you find the advice/support given: (please circle one)

<b>Very useful</b>	<b>Useful</b>	<b>undecided</b>	<b>Not useful</b>	<b>Not very useful</b>
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How could the café be improved?

Any other comments