
Maths for Business and Computing Students

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London South Bank University (LSBU) offers a range of business and computing related courses. These courses are designed to be flexible enough to enable students to progress in a variety of related subjects. The pathways offered help the student to specialise in their chosen area for example marketing, management science or e-commerce as well as a business studies, computing or business information technology degrees. The amount of mathematics required depends on the specialist area chosen. For management science the pathway is designed for students with strong mathematical abilities and combines a broad central business studies education with specialist units in application of statistical and mathematical techniques to business. Specialist units cover analytical decision making, optimisation techniques, project planning and control and survey sampling [1]. The growth in the importance of marketing to organisations of all types such as charities, arts and public bodies has led to many students enrolling and specialising in this area. Market research is an area, which needs both qualitative and quantitative techniques including the ability to carry out a survey and analyse the results. The mathematical and statistical ability is paramount for a student to succeed. The emphasis on the development of practical skills, which can be applied to working life, is the focus of the mathematical and statistical units of these courses.

Mathematical and Statistical aims

The mathematical and statistical units aim to produce students who are equipped to provide quantitative solutions to aid management decision making, using computerised tools, where appropriate, to accomplish these. The students need to be equipped with an understanding of relevant mathematical, statistical and management science skills supported by an understanding of the economic and business environments and commercial computing tools and techniques. Broadly the core themes are as follows:

- Identification, analysis and solution of problems that require a mathematically based solution in the area of management decision making.
- Fundamental mathematical theory and its applicability to decision making.
- Computer based tools and techniques in general and their applicability to the solution of quantitative problems.
- Qualitative techniques, survey methods and analysis of results.
- The nature of management, its place in business entities and the role of mathematics.

The academic drift towards more lectures supplemented by tutorials has been the main method of delivery of these units at LSBU. The Learning and Development Centre (LDC) has become actively involved in providing extra mathematical and statistical support for these students. The above core themes are what we would expect the students to study and be able to understand how and when to apply what techniques.

Support programme

The main problem we have at LSBU is that student's previous mathematical ability is varied and the mathematical skills that the students enter university with is extremely diverse. To devise a support programme that takes into account these diversities was essential. We, at LSBU, used our previous year's

programme [2] as a starting point and looked at what we offered and how this could be integrated into the Business, Computing and Information Management Faculty. We also looked at and investigated the following:

- Our one-to-one booking sheets, which includes the query the student is coming to ask about and tutors comments.
- The evaluation questionnaires from students.
- The syllabuses of the respective units.
- Comments from teaching staff on the respective units.
- Statistical data on the numbers of students taking the respective units.

One of the major problems we found is that, although students have a GCSE or equivalent in mathematics, the students come with very little confidence in tackling numerical questions. This lack of confidence then inhibits the student's development in the subject area. We at LSBU LDC concentrate on small group teaching ie. a maximum of 20 students per class using friendly and experienced tutors. Students often have a wide knowledge background, but perhaps a weakness in the application of this knowledge in particular when relating to mathematically based problems. Paul Wakeley, a student, reported that he found "*The method of teaching and learning in maths is quite different from those in many other disciplines*" [3]. The students at LSBU would tend to agree with his statement.

From our one-to-one booking sheets the most frequently asked topics were:

- Statistical graphs
- Basic algebra
- Percentages relating to business calculations

On our programme for, semester two, we have several timetabled slots for statistical graphs. We have decided for the next academic year to add this to our semester one timetable and call attention to the tutors to recommend their students. Basic algebra and percentages are already timetabled for semester one and two so some other methods need to be employed here. We have recommended to students that if several of them wish the same topic/question to be covered that they come together on a one-to-one session. The decision on whether we still call this a one-to-one session on our published programme has still to be addressed. We also recommend that students make use of the **math**centre website and work through the relevant worksheets [4]. We also carry a selection of these worksheets in our support room so students can see the type of material available. Percentages and basic

algebra in one form or another constitutes a significant part of the business students' numerical units and both the **math**centre sheets and our own LSBU in-house material is of a generic nature designed to be used for students across various disciplines. We have decided that we need to produce the same information but relating the question more to the business environment. Questions in context is what the students want and need. This poses us with the issue of writing these types of question and whether we can run one off sessions just for business students? Below is an example of the type of percentage question.

Increasing by a Percentage

Suppose we want to increase 200 by 20%
We get 20% of 200 (the increase) and add this to 200.

A quicker way is to multiply 200 by 1.2 ie.
 $200 \times 1.2 = 240$ but why 1.2? 20% as a fraction is 0.2 so we want to increase the original number by a fraction 0.2 ie. we want the original number + 0.2 of the original number. This is altogether 1.2 of the original number or the original number $\times 1.2$.

As a formula: **New value = Old value (1 + %increase/100)**

Examples (fill in blanks yourself)

TO INCREASE BY	MULTIPLY BY
35%	1.35
250%	3.5
2%	1.02
0.4%	1.004
128%	?
3%	?
0.6%	?
?	1.12
?	1.015

Although this question is still of a generic nature, the students are familiar with the terminology since 'increasing by a percentage' is used by their lecturer. A potential problem is that resources are not available to translate every topic questions to suit all degree/faculty structures terminology. One could question as to whether this is the most appropriate thing to do?

Evaluation questionnaire are given out to all students. The evaluation questionnaires ask the student the following:

What kind of feedback would you like to send?

Appreciation Suggestion Complaint Problem

The questionnaire then runs through a series of questions with space left for written comments.

From the evaluation questionnaires we did receive several *problems* of the business question nature. Hence it was clear to us in the LDC that we needed to review the support we offer.

From our evaluation sheets feedback, demand from students was that they prefer tutors to go over questions and explanations interjected by questions from themselves as the optimum delivery method. The spoken word coupled with relevant questions is the preferred medium. This supports Paul Wakeley's statement above.

Investigation into the unit syllabuses revealed duplication of topic areas and hence we were able to group support for several degrees together. Relevant timetable slots is always an ongoing problem since faculty unit timetables change each semester and each year. This will be an issue that is almost impossible to solve unless fixed timetables come into operation.

Comments from the teaching staff provide a valuable insight into the problems and difficulties that the students have. The same problems identified by the students were also stated by the teaching staff and also related to

the questions asked in the previous years one-to-one sessions. In light of the above we have tried to accommodate the students' needs in with our usual programme of support since there is only a finite amount of resources that we have at our disposal in the LDC.

Summary

Bill Cox [5] article 'Teaching – It's all in the Mathematics' outlined all of the above points raised above plus many more that we as educators need to take into account. A question to debate is whether we, at universities, should adapt all material to the relevant student discipline's terminology or should we encourage students to use material of a more generic nature? Clearly certain areas are discipline specific and questions should be couched in the respective discipline's terminology. If you have any comments regarding this then please feel free to send them to the author.

References

- [1] London South Bank University Undergraduate Prospectus 2004
- [2] <http://www.lsbu.ac.uk/caxton/maths/index.html>
- [3] Paul W Wakeley, *Why Chalk Talks in Mathematics Education: A Student Viewpoint*, MSOR Connections Vol. 4 No. 1, February 2004
- [4] <http://www.mathcentre.ac.uk/>
- [5] Bill Cox, *Teaching – It's All in the Mathematics*, MSOR Connections Vol. 4 No. 1, February 2004

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