

Mathematics Summer School at Bell College of Technology

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Abstract

The Mathematics Summer School was run for the first time in September 2001, lasting one week immediately prior to the start of term. Many students admitted to courses in the School of Science and Technology are perceived to have major weaknesses in the type of fundamental algebra that underpins much of their analytical work, both in mathematics units per se and in other units. This development represents one strand of additional support given to such students; the fledgling Mathematics Support Unit can give such support as the course progresses. This initiative is not funded in any direct way and depends on the availability of already heavily committed staff.

The Execution

In recent years, it has been increasingly noticeable that significant numbers of students find major difficulties with elements of their course requiring any mathematical competence. The main area of weakness is in identifying how and when to use fundamental algebraic techniques. Much additional staff time has been spent in trying to redress the balance. Most of this has, however, been done in an ad hoc way.

In the last two years, an attempt has been made to try and provide some sort of framework for this extra provision. Staff have judged which students may benefit from such help; the Mathematics Support Unit was therefore established. These students were given additional timetabled help, often on a one-to-one basis. Results were frequently very successful; most of these students succeeded in passing their courses. However, this type of arrangement is very onerous in terms of staff time.

In the spring of 2001, the School of Science and Technology decided that the Mathematics and Physics section should run a one week summer school for new entrants. The Chemistry section has run a similar event for students undertaking that subject in biological sciences courses for some years, with apparently some success. The aim was to bring the algebraic skills of these students to a level that would allow them to cope with the mathematical elements of their course. Thereafter, those perceived with remaining difficulties could still attend the Mathematics Support Unit sessions.

College management could not see their way to finance the project for either staff training or the purchase of material. The Educational Development Officer was prepared to offer up to £300 for the purchase of suitable mathematical software. Staff evaluated several packages but found that any with a seemingly appropriate title, and within our price range, was either badly explained or not relevant to our needs.

Hence, staff decided to subdivide the material into a series of topics, have a short handout on each topic (usually 2 or 4 pages) followed by a tutorial sheet with answers. The tutorial sheets were made progressive in that they constantly involved an understanding of the previous topics.

What Support Was Needed?

Staff from other areas in the School provided back-up assistance to alleviate the pressure of time on Mathematics and Physics staff.

The Barriers

The Summer School was offered to all new HNC/D students in the disciplines mentioned. A large percentage of Computing students took up the offer but only a small percentage of the others decided to attend. Unfortunately, some may have not attended because they received notification too late to change other plans. Indeed, some did not receive notification until the School had already taken place. It is to be hoped that in the future college administration can ensure that relevant information is received on time. Further, it is intended to follow up those who have not attended, to see why this may have been the case.

Evidence of Success

Full results are presented in Table 1. Results seem to indicate there is less necessity for Computing students to attend, although there is some gain in them doing so. It seems that well high compulsory attendance for engineering entrants may be profitable. Indeed, given past experience, it may be worth extending provision to degree students on these (and other) courses.

How Can Other Academics Reproduce This?

Another institution would have to start by deciding on the topics and the level that were required to be taught at its summer school. They could examine the material available from other summer schools which is available and decide if it could be used with or without modification. Things to consider are the format (e.g. one week, several days, interleaved with other summer schools, etc.) of the course and how it will be presented (e.g. promoting self study techniques). Thereafter the institution requires staff time which is an internal problem.

Other Recommendations

All students who attended seemed to show some improvement in their algebraic skills; many indeed have been able to cope with the level of mathematics in their course. Mature students, in particular, showed greater confidence as well as refreshing their skills. Others, although showing clear signs of progress, were still well short of reaching a level that would allow them to cope. These students were easily identified and have been given tuition on a one-to-one basis throughout the year via the Mathematics Support Unit. In the majority of cases these students have steadily improved throughout the session, achieving some capability at the level of mathematics that they require.

Unfortunately some students steadfastly refused to come to the Mathematics Support Unit even with significant encouragement. Next year such encouragement will be increased, hopefully providing greater motivation for students to attend.

Notwithstanding our efforts and the successes we have had, it remains questionable at the very least, whether the type of provision currently available can completely address the many deep-rooted shortcomings developed over twelve years of school mathematics education.

It is known that other Higher Education institutions offer a similar type of Summer School. It would be useful if the LTSN MathsTEAM could make a list of these available along with detailed information about their content. In this way institutions could share ideas and experiences in order to improve their provision. We may find something that can improve our particular lot.

Table 1

Computing students			
	Students scoring >50% in the initial test	Students scoring <50% in the initial test	All students
Number of students	15	9	24
Average percentage mark in the initial test	69%	28%	53%
Average percentage mark in the final test	91%	70%	83%
Average percentage improvement	22%	42%	30%
Non-computing students			
	Students scoring >50% in the initial test	Students scoring <50% in the initial test	All students
Number of students	1	18	19
Average percentage mark in the initial test	52%	28%	29%
Average percentage mark in the final test	90%	57%	59%
Average percentage improvement	38%	29%	30%
All students			
	Students scoring >50% in the initial test	Students scoring <50% in the initial test	All students
Number of students	16	27	43
Average percentage mark in the initial test	68%	28%	43%
Average percentage mark in the final test	91%	62%	73%
Average percentage improvement	23%	34%	30%