# COMPUTER AIDED ASSESSMENT AND LEARNING IN MATHEMATICS

Jeremy Levesley & Manolis Georgoulis
Department of Mathematics

## KEYWORDS:

The project involved the following activities:

a)  Audit of materials available on the internet for investigating the idea of convergence in Mathematical Analysis; this is a subject which students typically find difficult.

b)  Production of java applets for exploration of the ideas of convergence in analysis.

c)  Identification of partners in the sector for the development of tools for computer aided assessment.

d)  Training of Leicester colleagues in the use of software developed by colleagues from the sector.

e)  Installation of software system for computer-aided assessment (this has not worked).

f)  Dissemination to staff in the department through staff meetings.

g)  The broadening of departmental activity in the area of computer aided learning.

h)  The increase of experience developed in the department to the use of technologies for distance learning.

## 1. PROJECT OUTCOMES AND ACHIEVEMENTS

We have learnt a great deal on how to design and implement questions for online assessment, which proved to be a substantially different endeavour to designing questions in classical Problem Sheets. We also developed effective ways of giving fair marking schemes, as when working on a CAA-problem the whole calculation of the student is not available (hence, marks can only come from the answer). We also understood for which classes of problems it is beneficial to use CAA. Also, we have established collaboration and communication with Dr. Robert Scheichl and his group from the Department of Mathematics at the University of Bath, UK, that has already developed two CAA revision Problem Sheets for their Vector Calculus module. Moreover, a joint pool of template exercises and frequent discussion between the Leicester and Bath CAA teams are, currently, in place.

The impact of the project on the members of staff (JL, MG) and the PhD student (RH) involved has been substantial in terms of understanding of the needs and tricks of how to design CAA questions, as well as a lot of technical skills developed on how to actually construct CAA Sheets. Also, the collaboration between Leicester and Bath (detailed above) has been established, which is thought to be of great importance, in terms of technical knowledge sharing as well as sharing of the fruits of labour (common pool of Problem Sheets). The project has also had a wider impact in the department with other members of staff. In particular, Dr Snashall has used online assessments in Blackboard in her module MA1152, Introduction to Linear Algebra

## 2. EVALUATION

This has been a very important step towards more general use of CAA in the Mathematics Department at Leicester. The knowledge and experience gained has crucial, and without the funding we would have been unable to develop this. It is our intention to buy a CAA package MAPLE TA, and the experience gained by Dr Georgoulis and Mr Handel has allowed a good evaluation of the product and appreciation of what we might do with it. We are also considering building it into to the new DL course in Actuarial Science, and using it for new 1st year students to do do online self evaluation tests.

We have encountered problems in setting up a Computer Server so that the CAA Sheets could be used by the students. We sought support from Birmingham, but unfortunately this was very poor and sparse. We were not able to overcome these technical problems, as we are not trained to do so. We had also intended to buy the MAPLE TA software this semester for a trial but found out that it could not be installed on CFS in time for the trial. We are intending to use it from September.

There were also issues in terms of other members of staff using the JAVA applets that we had developed. Depending on their philosophy, they were more or less willing to use these. We should have got such people on board in the first instance. We were hoping that these activities might have provided some staff development for others, but this did not always work as we had hoped.

## 5. CONTINUATION OF THE PROJECT

Once a server is set up (see point 9) we are planning to use the material prepared in the Module MA2081. Also, we have already disseminated a great deal of common experiences with the group at Bath. Expertise will also be disseminated among all of the tutors on the DL modules, and to staff who administer the first year induction activities. This will reach most members of the department in time.

Our key accomplishments were in the understanding of the potential for CAA. We intend to use MAPLE TA for:

•self assessment work for incoming first years
•assessment on modules MA1152, MA2081 in the first instance and then roll this out to other modules
•self evaluation activities in the DL programme in Actuarial Science where technical problem solution algorithms are being developed
•engage other departments in the use of this technology so as to share the cost of the software.