

# Videoconferencing in Mathematics

Neil Pitcher

Teaching context	
<b>Subject area</b>	Mathematics.
<b>Course level</b>	2 <sup>nd</sup> year undergraduate.
<b>Participants</b>	Staff 2, one at each site. Students 16, 8 at each site. Participants had not met.
<b>Type of use</b>	Keynote lecture.
<b>Teaching methods</b>	Lecture with online Q&A session.
<b>Support materials</b>	Courseware demonstrated at conference.
<b>Length of use</b>	Single trial of videoconferencing.
<b>Project background</b>	Part of the SUMSMAN project (Scottish Universities Maths and Statistics across the MANs), a SHEFC-funded Use of MANs Initiative.
<b>Sites</b>	University of Paisley and Heriot-Watt University, Edinburgh.
<b>Prior experience</b>	No prior experience but training given. Enthusiastic about the technology.
Technical context	
<b>Conference type</b>	Point to point.
<b>Technology used</b>	Studio based MAN conference.
<b>Additional equipment</b>	Visualiser, camera controlled by voice tracking, video recording of session.
<b>Software</b>	Shared software applications via MAN networked PCs.
Contact	
<b>Contact name</b>	Dr. Neil Pitcher
<b>Contact details</b>	Department of Mathematics & Statistics, University of Paisley, High Street, Paisley, PA1 2BE. Tel: 0141 848 3504 Email: PITC-MS0@paisley.ac.uk <a href="http://www.maths.ed.ac.uk/~ama/UMI/">http://www.maths.ed.ac.uk/~ama/UMI/</a>

## Background

In identifying a subject of common interest to Mathematics students in different universities, we focused on Mathwise, which is a multimedia system produced as a Teaching and Learning Technology Programme project. Mathwise is in use at many universities, but students require training in how best to use it. The aim of the keynote lecture was to have Mathwise experts present the system to students, who would then use it in their courses.

## Why videoconferencing was chosen

Our aim was to present a keynote lecture in Mathematics to students in different universities at the same time. Our intention was to experiment with videoconferencing as a medium to achieve this. We carried out a pilot study and have made recommendations as to how videoconferencing might be used more widely in Mathematics teaching.

## The Execution

Two groups of students participated, one at the University of Paisley and the other at Heriot-Watt University. One Mathwise expert was at Paisley and presented the system's Learning Units, whilst the other Mathwise expert was at Heriot-Watt and described its assessment facilities. The Mathwise software was demonstrated "live" via the MAN from one location to the other, using a PC at each site.

Eight students were present at each site, seated in close proximity to the speakers. At one site the speaker was facing away from the students, which made interaction difficult. In order to promote interaction, each presenter spoke for just 15 minutes and questions were invited from the students after each presentation. However, the amount of interaction which took place was limited. Some questions were put to the presenters, but these were mostly asked of the lecturer at the same site. Students seemed to find it harder to ask questions of the presenter at the other site.

However, in the evaluation study students were very positive about the experience. In general, they felt that they had a good opportunity to put questions, but they did feel slightly more inhibited than in a normal lecture. The students said that the videoconference session was more interesting than a normal lecture, but

this was because it was a new experience. They would like to have more classes by videoconference if this were possible.

A subsequent videoconference session was used to gather feedback from students on the Mathwise system itself. Here the focus was on students' opinions and discussion, rather than on mathematical information. In this second session the level of interaction among students was far greater. Students conversed reasonably freely between sites.

## What support was needed

We benefited greatly from the training provided by TALiSMAN. In fact, without such training we would possibly not even have attempted to use such technology, as it is such a radical departure from the traditional lecture. The training was invaluable as it provided an overview of the technical aspects and also enabled us to consider what the experience was likely to be like for the students, and indeed for us as presenters.

Excellent technical support was provided by each of the universities. Without this assistance, the videoconference sessions could not have been conducted smoothly.

## Evaluation comments

Evaluation was carried out via questionnaire and interview. Formal evaluation was carried out within the SUMSMAN project, of which this experiment formed one part. The students were positive about the overall experience of using Mathwise in conjunction with a demonstration session by videoconference. They felt that the videoconference was a good preparation for Mathwise and that the software provided an effective way to learn a mathematical topic.

The students particularly appreciated the opportunity to see a demonstration of Mathwise by two of the experts who had produced the system. They also felt that videoconferencing would be a good method to present classes, particularly when there are too few students wishing to take a subject at any one university.

The students were also asked how they would like to see videoconferencing used in their Mathematics courses. Their response was that they saw it as a useful teaching method, alongside other classes and as an occasional change. Not one single student was in favour of replacing all lectures by videoconference sessions.

## The Barriers

The one significant difficulty was with scheduling. Timetables at different institutions are inevitably fixed and large scale flexibility in terms of moving classes to other time slots is not possible to achieve. For our keynote lecture, which was a "one off" event, it did prove possible, by asking favours of various colleagues, to arrange for both sets of students at the two institutions to be available at the same time, and to book the same one hour slot on the MAN.

## The Enablers

The keynote lecture was delivered jointly by two colleagues: Dr. Neil Pitcher at the University of Paisley and Dr. David Wild at Heriot-Watt University. Both presenters prepared thoroughly, to the extent of working to a pre-written script and an agreed agenda. As a result the session was conducted smoothly.

The network proved reliable for the session and the quality of pictures and sound was good.

## Advice for new users

Through these initial experiences I came to the view that the best use of videoconferencing with students is likely to be in small group work, where interaction is a vital part of the session. In videoconferencing it is of the essence to get students conversing with each other. Possible activities could be student presentations, problem solving exercises sharing computer applications, or student feedback debates on relevant topics.

Keynote lectures are feasible, but interaction is likely to be limited. It may be that a "chat show" format could be an appropriate model for such a session by videoconference. As for the formal presentation of standard lecture material, videoconferencing may have little to offer beyond the simple expedient of making videos and playing them back to students at home or in the lecture theatre.

A general comment is that far more preparation is needed for a successful videoconference session than for a conventional lecture. Preparation needs to give meticulous attention to detail, even to the point of writing a script and planning camera shots.