

An eye for an eye or an eye to the future

Item Type	Chapter in book
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Citation	CELT Learning and Teaching Projects 2004/05
Publisher	University of Wolverhampton
Download date	2025-05-15 05:28:38
Link to Item	http://hdl.handle.net/2436/3108

'An Eye for an Eye' or 'An Eye to the Future'

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Background and rationale

BM1119 Human Physiology is a large level 1 module accessed by students on a wide variety of awards from the School of Applied Sciences and the School of Health. The diversity of the student body means that while some students come to the module familiar with the content, others do not have a strong background in the material. This latter group of students benefits from an enhanced level of tutor contact, enabling them to ask more questions and obtain a learning experience tailored to their needs. It was for this reason that 3 years ago the traditional lecture and tutorial based delivery method was replaced with an interactive workshop-based approach. Contact sessions consisted of a 3 hour workshop during which students would research and answer questions presented to them in a booklet format. Staff would provide a variety of textbooks during the sessions and would be available throughout to assist students in their research or understanding of the material. Students were permitted to leave the room to access material in the Learning Centre or use university computers. Workshop sessions were supported by lecture, tutorial and formative assessment material available on WOLF (Wolverhampton On-line Learning Framework) and the School of Applied Sciences computer cluster. The workshop booklets themselves were also available on WOLF to enable students to prepare for the workshop sessions in advance, or cover the material during study time should they miss the workshop session for any reason.

It was found that students adopted a learning strategy which most suited their needs. More able students and those with a strong background in the course content would often study privately, accessing the online material and completing their workshops with minimal staff contact. However, the system enabled weaker students to make use of the available staff in workshop sessions to assist them with their learning, as well as making the use of the other resources available. The overall outcome of this change in delivery methodology was a modest improvement in module pass rate and average grade.

While the new workshop-based delivery seemed to be a success in terms of providing the flexibility for students to adopt their own learning strategy, there were some inconsistencies in accessibility of learning facilities for the workshop groups. Those located in more remote university teaching rooms were disadvantaged in that they did not readily have access to a networked computer to access WOLF or the internet. These students tended to remain in the classroom throughout the session and therefore did not benefit from the wide range of material available online or on the School of Applied Sciences (SAS) computer cluster located in the main science teaching facility at the University's City Campus. Students thus affected could offset the loss of these facilities by printing the lecture notes from WOLF in advance, but this had an obvious financial penalty and did nothing to compensate for the lack of access to interactive tutorials and the internet.

The aim of this project was to trial a method of running workshop sessions which maximised the accessibility of the wide range of learning resources available to the students.

The innovation

In order to provide students with the easiest access to WOLF, the computer-based interactive tutorials on the SAS computer cluster, and the internet, we set up a workshop group which would undertake their classroom sessions in the cluster and be linked to a member of staff by webcam. Because of the limited number of computer terminals available, 8 students were recruited from the module cohort of 106 in the first week of the module. In subsequent weeks, instead of attending their allocated workshop group, they would attend in the computer cluster in MA block during the same period. Like the students in the conventional workshop groups, the webcam group were provided with a paper copy of the workshop booklet and a selection of textbooks. In addition to this, they were each provided with a computer workstation, which was connected to the SAS student server, equipped with a Phillips ToUcam Fun II webcam (incorporating a microphone) and headphones. The designated tutor for the session did not go to the classroom with the students but stayed in their office and used their office PC (which was connected to the SAS staff server and identical webcams and headphones to the students) to respond to students' questions. The webcams were linked so that students could dial-up the member of staff at any time during the session via Microsoft NetMeeting. Apart from the need to use the webcam to speak to the member of staff running the workshop group, students in the webcam group were treated in exactly the same way as students in the other workshop groups.

Throughout the semester, each student on the module was monitored for attendance at workshop sessions, whether they had satisfactorily completed the workshop booklet by the end of the session, and how much they had accessed WOLF during the week leading up to the end of the session. The latter was achieved by using the student access tracking facility on WOLF and noting each individual's weekly accessing of 4 different facilities available on this module's WOLF topic: the module guide, workshop booklets, lecture notes and multiple choice (MCQ) formative assessment exercises. Each of these parameters as well as overall module grade were compared between the webcam group and the other workshop groups, and correlations were assessed between attendance, the level of WOLF access and module grade for each the cohorts of students. Feedback questionnaires were also used at the end of the module to evaluate both student and staff perceptions of the webcam group approach to delivery.

The Outcomes

The outcomes of this project can be broken down into 3 main categories: did the technology work to a satisfactory level?, what were the benefits and drawbacks for students and staff?, and how did the delivery method affect student access to the learning resources and their overall module grade?

The Technology

Assessing the degree to which webcam communication was a feasible and desirable method of contacting a tutor was a major aim of this project. Overall, the webcams used were found to offer excellent picture quality for this type of application. The resolution was very good, and picture update of sufficient frequency to be of use in the communication process. One problem which did arise was that of poor sound quality. This was found to be due to the poor quality of the built-in microphones in the webcams, exacerbated by air conditioning fans in the computer suite generating a high level of background noise. These problems could be alleviated either by the use of higher quality webcam/microphone combinations or by the use of a separate external microphone. Microsoft NetMeeting was found to be easy to use for both staff and students, and had the additional facility of providing a Microsoft Paint-style notepad which could be used to type messages or draw diagrams. Communication using the webcams was fast and reliable despite the link running through two servers. This arrangement did however preclude the option of the tutor communicating with more than 1 student at a time to avoid overloading the network. However, the success of this trial is encouraging and indicates that intra-university webcam communication is viable, and inter-institution or institution/home communication is also feasible.

Benefits and Drawbacks

The benefits for the students taking part in this study were that they were able to access more of the learning resources available to them while at the same time still maintaining the ability to communicate with a member of staff should they require help, advice or explanation. If this technology were applied to inter-institution or institution/home communication, it could provide a platform for learning outcome delivery or tutor contact without the need for students and/or staff coming into the university. This could be an advantage for part-time students who often find it difficult to come to university to speak to a member of staff when communication by telephone, email or WOLF forum would not be as multi-modal or interactive. The benefits for staff running the webcam workshop is that after a short period of contact where booklets and textbooks were distributed, the rest of the session was conducted from their office. This enabled staff to work on other things and speak with colleagues or students during those times when workshop students did not require help.

Perhaps one drawback is that without a member of staff being present in the workshop, students are more reluctant to ask for help. Also, students who are less able to use the technology would be disadvantaged when it comes to accessing the tutor. Neither of these problems arose in this study, but this could be due to the fact that the webcam group were self-selected and therefore keen and able to use technology. In a cohort of students who are all using webcams, it could be important to provide training and experience of using the technology in advance.

Overall, the students in the webcam group had a similar attendance rate (51.39% v. 52.83%, $p > 0.1$), and slightly higher WOLF access rates (30.28% v. 24.08%, $p < 0.3$) and module grades (6.38 v. 5.9 mean grade point, $p > 0.1$). This demonstrates that the students in the webcam group made slightly better use of the learning resources available, and that the delivery of the module material supported by webcam tutor interaction was not detrimental to their performance.

Benefits

This project has demonstrated that it is possible to use webcams as a method of student/tutor communication such that it is beneficial for both students and tutors alike. The benefits for the student can be that they have ready access to a wider range of learning resources while still having recourse to tutor engagement, or maybe can access resources and a tutor from another location. And as with all technology supported learning, students also gain valuable experience of IT applications which will be of use to them in their careers. For staff, it also makes the teaching forum more flexible, allowing them to undertake other tasks at the same time as supervising and engaging with students while they are learning.

Evaluation

Students in the webcam ($n=8$) and the conventional workshop ($n=98$) groups were assessed for attendance, engagement with WOLF and overall module grade. Figure 1 shows that the webcam group showed similar attendance and overall grade statistics to the non-webcam group ($p > 0.1$, t-test in each case), but did appear to make more use of support material located on WOLF ($p < 0.3$, t-test).

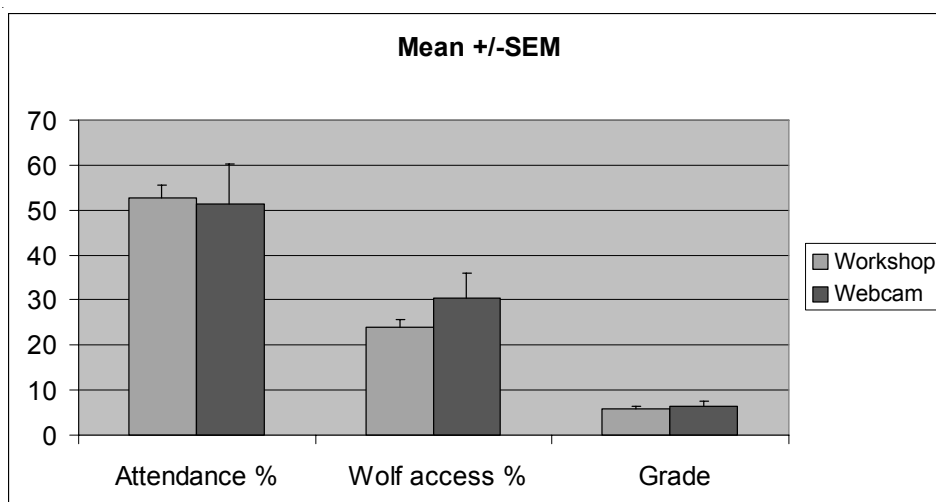


Figure 1.
Mean attendance, WOLF access and Module Grade in the webcam and traditional workshop groups.

One of the objectives of this project was to enable students to make use of the support material available on WOLF while they were undertaking their workshop tasks. Figure 1 shows that the webcam group did appear to use WOLF more than the other workshop groups, and furthermore the webcam group showed an increased correlation between their attendance and WOLF access ($R=0.77$ webcam v. 0.62 traditional workshop), indicating that the students were accessing WOLF while they were in the webcam workshop session.

Feedback from students in the webcam group via the end of module questionnaire revealed that they found the webcams easy to use, with good picture and sound quality. They felt that they liked the webcam workshop format and that ready access to the support material on the computers facilitated their learning. Some students reported that they would like the opportunity to consult tutors via webcam from home. The majority of students thought that more modules should use webcams as a way of communicating with staff.

Comments from staff generally mirrored those of the students. They felt that the webcams functioned to a high standard, although the 'Sound quality could be improved.' There was a feeling that there was a 'Reluctance by students to use the webcam' to ask questions, possibly because of the wealth of support material available. As a result it was difficult to assess student engagement with the workshop, so it would have been beneficial for the system to be configured so that staff have 'Access to call up students' or monitor their activity, both of which can be set up in NetMeeting. Generally it was felt by staff that the webcam method of communication with students has advantages because the 'Synchronous dialogue can be used to construct learning' and is therefore 'A distinct advantage over asynchronous discussion using the [WOLF] forum' and email. Overall it was felt that 'The use of webcams was an interesting way of teaching this module' and 'That with some development, this could be a very good method of teaching'.

Future developments

This project has revealed the potential for webcam communication to support the learning experience and to facilitate access to learning resources and tutors. Developments of this work could lead to the greater use of similar communications technology to support student learning for more students across a wider range of modules and awards. It could also enable student access to live tutor communication from remote locations, making the valuable tutor/student interface more cost-effective and frequent for distance learning students or students for whom access to the institution is difficult.