

# [O1] Using an audience response system in lectures: an aid to learning or just more entertainment?

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## ABSTRACT

Results of a trial using the IML Audience Response System in first year physiology lectures are described. The lectures provide the core material for a heterogeneous group of students on a variety of in-house undergraduate programmes and service teaching modules. The lectures are supported by additional classes for various groups.

The diversity of the group has for a number of years presented a challenge for teaching staff. Many students are mature with no formal study for sometime; others do not have a science background. Increasing student numbers has made communication between the lecturer and their audience almost impossible. Feedback therefore about how the material is being received and understood by students is hard to obtain.

This year the IML system was introduced as a means of improving communication in lectures and consequently gauging the level of understanding amongst the students. The system was employed every 3 weeks in 1 of 2 lectures given each week. Handsets were provided to groups of 2 or 3 and used to register the group by identifying the course they were studying. After a short familiarisation test the students were asked multiple-choice questions on the material from previous

weeks. Answers were logged after a short interval (timed in later sessions) and displayed as a distribution table for each of the options. The answers were then discussed and reasons given for the correct option.

Staff observation notes were collected and student focus groups were established to provide detailed feedback of the process. A questionnaire was also provided for all the class to gather more quantitative data.

The results of the trial may be summarised as follows, using the IML system:

- Promoted discussion about the material
- Made lectures more entertaining
- Improved confidence about what to expect in the exam
- Increased motivation to research, review or learn the material

There is no doubt that the students enjoy using this system although familiarisation is swift and therefore entertainment value is perhaps short lived. The value as a learning aid is less clear but motivated, mature students do value the insight to the assessment process, and appear to benefit from a greater understanding of the material.

## INTRODUCTION

The taught material for level 1 physiology at the University of Central Lancashire is delivered in common lectures to students studying a variety of programmes. All students are also given separate tutorials some of which are face-to-face others are on-line. One group has additional laboratories as part of their programme. All of the additional contact with the students is designed to support, reinforce and put into context the material they have been given in lectures.

The diverse nature of this group has for a number of years presented a challenge for teaching staff. On the one hand using lectures in this way has the obvious advantage of efficiency. However the pitfalls are considerable particularly with a novice group. Many students are mature with no formal study for sometime, while others do not have a science background, yet another group are accepted with 3 science 'A' levels with a total of 240 points.

Great care is taken to ensure that the delivery of the classes is as good as it might be: lecture materials are made available before the classes, staff give advice on good supporting text, formative on-line quizzes are provided for students to assess their understanding of the material and they are encouraged to access local web based material that visualises some of the more difficult principles involved.

Despite the support material provided for lectures an inherent weakness with this system is that in large groups of students, individuals are generally reluctant to ask questions or interact with the lecturer even if encouraged to do so. Feedback for the member of staff therefore relies on marks from the on-line quizzes or interaction from the tutorial and laboratory groups. This type of feedback whilst adequate is not immediate and might be rather indirect if different staff are involved in the delivery of lectures and tutorials or laboratory classes. So if problems of understanding do arise they may go unnoticed.

Before the start of the 2004 – 5 academic year the University purchased the IML Audience Response System. The system is based on DECT technology at 2.4 GHz with a 100 metre range for data responses and audio. It consists of a PC, the receiving base station and the handsets. Question Wizard, the software creates quizzes in PowerPoint and provides instant audience responses live on screen. Question Wizard is based on an Access database and provides extensive reporting functions on your responses.

A small number of courses were used to pilot the system and to evaluate its effectiveness. The aims of this pilot were to:

- assess the effectiveness of the IML system to increase student engagement with the material during lectures and
- improve feedback in lectures about the level of understanding of the material.

## Deployment

Level 1 physiology lectures are to 230 students for 2 separate one-hour slots each week for the year. Students were given a calendar showing when the quizzes would occur and reminded the week before they were held. The system was employed every 3 weeks in 1 of the lectures. Handsets were provided to groups of 2 or 3 and used to register the group by identifying the course they were studying. After a short familiarisation test on the first occasion students were asked multiple choice questions on the material from previous weeks. Answers were logged after a short interval (timed in later sessions) and displayed as a distribution table for each of the options. The answers were then discussed and explanation given for the correct answer.

Staff observation notes were collected and student focus groups were established to provide detailed feedback of the process. A questionnaire was also provided for all the class to gather more quantitative data.

As statistical analysis was used on the mid year test results, groups were compared from the current and previous academic year. Differences were tested using a one tailed t test.

## RESULTS AND OBSERVATIONS

Student focus group responses:

Students were asked about their experience of large classes. For some this was the largest group they encountered:

*'Well it's ok. We know a lot of people from the other courses.'*

*'(In a small class) If you struggling with your work . . . they'll listen to you and go over that point again just for you but when it's a bigger lecture you're less likely to actually put your hand up and say "excuse me what was that?"'*

Interesting although not unexpected comments came from a discussion of the lecture notes that are supplied to the students:

*'(Students) go to the lecture but then don't really listen that much because you know you've got the back up of the notes on Webt CT.'*

Most students questioned about their thoughts on the IML system replied that they liked it:

*'I would really enjoy it if all my lecturers did it – not loads but quite often.'*

*'I thought it was really useful. It really showed us what we needed to know for the exam.'*

*'I wouldn't have thought the novelty would wear off because we don't do it that often.'*

When asked if they thought the system enhanced the lectures replies varied but consistent themes were:

*'I thought it was very good at recapping over things we do and it helps highlight things that we don't know.'*

*'Yes, if you knew you were having a quiz, you were actually reading your work. So for me it was really useful for learning because I wouldn't have read those notes if we didn't have a quiz.'*

A key feature of the quizzes was the use of the groups and the registration of the course. The students appeared to appreciate the interaction and the element of competition between courses:

*'It's good because it gets you talking and discussing.'*

*' . . . everyone was discussing the answer, so it got you working together didn't it?'*

*' . . . at the end they showed where each of the courses came and I think that made everyone want to get the answers right too.'*

*' . . . it's like we're teaching each other as well.'*

During the quizzes explanations were given directly following the questions:

*'You answer the question and then they go over the answer with you and like actually describe why it's wrong or right. It's like a mini lecture itself just going over the answer.'*

### Staff comments:

As part of a Peer Observation System at the University staff attended the IML quiz sessions and provided feedback. Two of the comments raised are recounted here.

On one of the early sessions it took over 10 minutes for the system to be set up. This raised the concern that the benefit of using the system was outweighed by the time to produce the quizzes and set up at the start of each lecture.

One member of staff was sat amongst the students and noticed that while some groups were actively engaged in the quiz discussing the questions others were not. In the latter case the students were going with a 'gut' feeling about the answer without the benefit of discussion. Strategies to improve the dialogue between group members will need to be considered in the future.

### Statistical analysis:

In all groups the mid year results were higher for the 2004 cohort but only those from the BL1403 group were significantly different. This group consists of students whose main degree is physiology or other biological science. The BL1408 group are complementary medicine students studying physiology as part of a wider program. The last group (BL1410) is made of three groups: Sport Science or Sports Therapy and Exercise, Nutrition and Health.

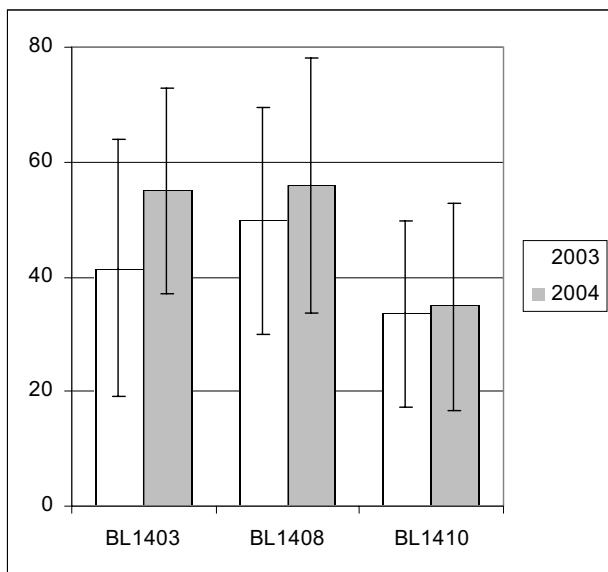


Figure 1. Shows results of the mid year exam for the different groups of students attending the level 1 physiology lectures in the academic years 2003 – 4 and 2004 – 5. Each point is mean  $\pm$  SD,  $n = 41 - 79$ . The difference between the results for 2003 and 2004 in Group BL1403 was highly significant ( $p = 0.001$ )

## DISCUSSIONS AND CONCLUSIONS

There is no doubt that the students enjoy using this system. Familiarisation is swift and therefore entertainment value is perhaps short lived but the comments from the focus groups suggest that students appreciate the benefit to them beyond simple entertainment. The value as a learning aid is less clear but motivated, mature students do value the insight to the assessment process. The statistics suggest that subject majors do benefit from the learning experience.

The results of the trial may be summarised as follows, using the IML system:

- Promoted discussion about the material
- Made lectures more entertaining and improved attention
- Improved confidence about what to expect in the exam
- Increased motivation to research, review or learn the material