to the students? The goal is to effect in them new competence to pursue these paths on their own; to be able to use the information and skills in further studies and applications; to incorporate these into their repertoires. What makes this possible? The new information is learned in a memorable context in which the student has already established a mental and experiential file.

Perhaps we can conclude that a lecture is not a treat (*i.e.*, a giveaway to passive recipients), but a treatment. Through it, something is being done to the students to widen their horizons, to help them understand what they learn and to see how they can use this new knowledge for their own purposes in their own working environment.

Thus, when we stand before our students, we must remember how much more we can do and be for them than the 'great dictator'! ※

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Simple Improvements to Staff-Student Communications

Janice C. Harland

INTRODUCTION

A problem for lecturers is to know whether they are presenting their material in a sufficiently interesting and understandable fashion and at a pace suitable for student comprehension. New and occasional lecturers tend to be nervous, feel they must put across everything they know and assume that students can comprehend more in a given time than is realistic. Thus they often proceed too fast and try to cover too much material, although they are usually enthusiastic and make their subject interesting. More established teachers, while generally aware of students' capabilities, may be bored with the material they are presenting for the nth time, particularly at basic level, and some fail to update sufficiently frequently.

Another problem is assessing how much previous knowledge students have in a particular subject area. Repetition and reinforcement is not necessarily bad, but in excess will bore students. Equally, unjustified assumptions of knowledge can leave students floundering and unable to understand new work. Both problems result in students performing below their best and this can have adverse effects on their future prospects. Associated with this is the question of the level at which material should be pitched, particularly to a class which is not known to the lecturer. Introductory lectures which would be incomprehensible to honours or even post-graduate students are not unknown! We could all cite lecturers we would consider brilliant, boring, incomprehensible and so on, and yet we expect our students to have equal enthusiasm for, and knowledge of, a subject regardless of who is delegated to teach it. In this Department, as in many others, comprehensive objective lists are used in introductory courses to overcome some of these problems but at honours level, while it is relatively easy to define the skills we expect our students to acquire, it is less easy to define the knowledge we expect them to have, as all have different interests, projects, etc. Indeed, it is debatable whether we should even try to impart a specified body of knowledge to our advanced students. While Course Organisers have overall control over what is taught in their courses, it is much more difficult to

LECTURER'S NAME:
LECTURE TOPIC:

PLEASE MARK APPROPRIATE COMMENT(S) UNDER EACH HEADING

1. Audibility
   - Very clearly audible
   - Usually audible
   - Sometimes audible
   - Almost entirely audible

2. Presentation
   - Lively and varied
   - Made the subject interesting
   - Involved the class
   - Average
   - Dull, uninteresting approach
   - Monotonous

3. Speed
   - Much too fast
   - Sometimes too fast
   - Optimal
   - Rather slow
   - Tediously slow

4. Amount of material
   - Far too much
   - A bit too much
   - Optimal
   - Rather thin
   - Nothing new

5. Organisation
   - Lectures well planned
   - Easy to follow
   - Average
   - Material muddled, out of order, etc
   - Repetitious

6. "Question time"
   - Adequate time was allowed for questions
   - More question time during or after lecture is needed
   - Lecturer's response to questions was good
   - Attitude dissuaded students from questioning
   - Posed thought-provoking questions to the class
   - An extra tutorial would be helpful

7. Use of visual aids
   - Well set out
   - Poor layout
   - Legible
   - Difficult to read
   - Satisfactory use
   - Insufficient use
   - Inappropriate use

   Other comments:

8. Reading list
   - Sufficient references provided
   - Insufficient references were provided
   - The list was too long
   - The most important references were not indicated
   - The books/journals were not available
   - No list given

   Other comments:

9. Material covered
   - Clear where this fits with the rest of the course
   - Not clear where this fits with rest of course
   - Subject too abstract
   - Seemed irrelevant
   - Needs more time, for expansion
   - Current state of the subject not explained
   - Use of this subject not explained

   Other comments:

10. General comments:

Signature *Date*

Fig. 1. Lecture Evaluation Sheet

know in detail what has and has not been covered by particular lecturers, especially with a subject which has been taught at a more junior level by a different member of staff.

In a totally different area, many staff wish to introduce new teaching formats, 'educational technology', etc., and also to assess the effectiveness of their more established methods of teaching. They wish to know how different techniques are perceived by students and how effectively they

are aiding learning, without having the resources to perform detailed controlled tests on large numbers of students. Education is after all a service and like all consumer-oriented operations should ensure it is meeting the needs of its 'customers'.

Students, too, can have problems, which may be associated with particular lecturers – for example, ignoring their requests for assistance – or with more general aspects of the course, which are not necessarily apparent to the staff who teach them only occasionally.

STAFF-STUDENT LIAISON

From all points of view it is desirable to get some feedback from the students on how they see the courses developing, well before exam time – when it is too late to correct anything. We have always had informal feedback from some students on each course but this was patchy and not always heeded. To augment it, a staff-student liaison committee was established. This group, consisting of the Head of Department, the course organisers of the science courses (the medical students have a separate system) and two elected student representatives from each course, now meets about 5-6 weeks after the start of each term. It has no fixed agenda but discusses any problems which either staff or students wish to raise. It is very important that this group is not seen as a complaints session with either staff or students dominating. The topics discussed to date include ventilation in lecture theatres, balancing access to photocopying facilities with problems of uncharged copies, timing of practical sessions and departmental seminars, provision of blank spaces on lecture handouts to enable students to annotate diagrams, etc., concern at persistent late arrival or absence of students from lectures, what time lectures should begin and for how long they should last, and availability of recommended reading materials. Students also developed the confidence to speak out on matters relating to course content and any problems they had with the styles of particular lecturers. We agreed to instigate an evaluation system so that students could make appropriate comments to each member of staff about their lectures.

LECTURE EVALUATION

Initially some members of staff were reluctant to accept lecture evaluation, saying that students would make only negative comments, and that 'this sort of thing' had been tried before and failed. However they agreed to a trial period if all students were required to fill in a sheet for each lecturer and sign the forms. A possible format, based on that used for peer evaluation at a short course for new lecturers run by the four smaller Scottish Universities, was circulated to staff and students for comment. After revision, two designs are currently in use.

One (Fig. 1) is used when students receive a block of lectures from a single lecturer. It is double sided, and includes space at the end for students to make general comment about the series of lectures or indeed about the course. They are sometimes asked to comment on particular aspects of the course, such as how practical classes are progressing, how tutorials are helping them and so on for the benefit of the course organisers. Evaluation is carried out weekly during long blocks of lectures, midway through and/or at the end of shorter sessions. The other design (Fig. 2) is used where students get one or two lectures from one member of staff followed by one or two from another and so see many lecturers in a single week. The period of evaluation is always weekly. The reverse of this form is blank, for students to make additional comments about lectures and/or other elements of the course. The distribution, collection and initial analysis (summation of comments) of forms was organised by a single member of staff. Summaries, and where appropriate, the original forms (of Fig. 1 type only, for confidentiality), were handed to the lecturer as soon as possible. Course organisers could also have copies of summaries.

For the introductory course, where the students are together only at lecture times, each lecturer was given sufficient forms for the class and organised their distribution and collection, passing the completed forms to the members of staff responsible for analysis. Usually, forms were handed out in

Lectured Topic

SECTION A Please grade from 1 to 5 as indicated; a score of 3 is optimal or average.

1. AUDIBILITY: 1. almost entirely inaudible 5. very clearly audible
2. SPEED OF DELIVERY: 1. tediously slow 5. much too fast
3. AMOUNT OF MATERIAL: 1. nothing new 5. far too much
4. ORGANISATION: 1. muddled and repetitious 5. well planned, easy to follow
5. PRESENTATION: 1. monotonous 5. lively and varied
6. OPPORTUNITY FOR QUESTIONS: 1. no time allowed 5. plenty of time
7. USE OF VISUAL AIDS: 1. inappropriate or insufficient 5. well set out and legible
8. READING LIST: 1. no references supplied 5. too many references to cope with

SECTION B Please indicate for each topic the numbers of those statements which you feel apply.

1. The subject was made interesting.
2. The method of presentation involved the class.
3. The lecturer posed thought-provoking questions.
4. The lecturer's attitude dissuaded students from asking questions.
5. Inadequate response to students' questions.
6. An extra tutorial would be useful.
7. The most important references were not indicated.
8. The recommended reading was not available.
9. It was clear how this topic fitted with the rest of the course.
10. It was not clear how this topic fitted in the course.
11. This subject is too abstract to be useful.
12. This subject seems irrelevant.
13. This subject needs to be expanded.
14. The current state of this subject was not explained.

Fig. 2. Lecture Evaluation Sheet

one lecture and collected the next. This was not an ideal system because (a) not all the forms handed out were returned (about 80-90% recovery was usual), (b) students not present at the handing out session rarely asked for a form, so a possibly dissatisfied section of the class was not making their comments known, (c) students had the opportunity to be influenced by the opinions of more dominant colleagues or to make collective rather than individual comments, (d) completion of the forms did not become a regular routine for students, and (e) students did not necessarily get the opportunity to comment on whether staff had heeded their comments. Despite these limitations most members of staff have found the forms useful. Students have been as quick to praise as to condemn and have not, for example, been afraid to tick 'too slow' or 'rather thin'. A surprise for some members of staff was that the blackboard was not considered a 'visual aid'! Visual aids is the one area where many students made additional comments, and at least one lecturer invited specific comments on his use of handwritten overhead projections as compared with those he had prepared on an Apple Macintosh microcomputer. There were few comments specifically on lecture content and in retrospect it is probably sensible to include a section directly questioning this topic, *e.g.*

Quality of material: *Already covered in other lectures*
Some overlap with other lectures
All new but all understandable
All based on uncovered material
Coverage too shallow
Coverage too deep
Please specify particular problems:

The Junior and Senior Honours students study only biochemistry and so a weekly slot for lecture evaluation could be timetabled. Evaluation was overseen by a single member of staff. Each week the students were given forms to fill in for each member of staff who had lectured during the preceding week (usually two) which had to be completed and handed in before the students left. This avoided most of the problems associated with

the introductory course evaluation. Students were honest and did not fill in forms relating to lectures they had missed. Like the students on the introductory course, the honours students were willing to make constructive comments and, as they knew the staff better, were also more confident in suggesting ways of improving presentation or content. Their willingness to compare lecturing styles helped keep lecturers on their toes!

Members of staff do not usually give all their lectures to this class at one time, so students were quickly able to see that notice was being taken of their comments. On their second or subsequent evaluation sheet, staff were pleased to find comments such as 'Much better than last time', 'I understood these lectures better', 'Thank you for slowing down', and to see from the number of ticks that they had improved those aspects of their teaching which had previously been causing problems. The students appreciated the efforts the staff were making to teach well, and the staff were pleased by the honest comments and positive attitudes of the students. An interesting development was that some students became more able to talk freely with staff about any problems.

INTERVIEWS

A system of interviewing all the honours students individually during the first term of their courses has been introduced. These are informal discussions with one or two members of staff who know the class well, to talk about how the staff and the students feel about their progress. This can cover advice on how to use lectures and lecturers, exam technique, etc., and also personal problems which are affecting the students' abilities to work. Careers advice may also be given at this time.

ANALYSIS

The staff-student liaison groups have now been meeting for two years. One problem they have faced is lack of continuity from student representatives, and particularly for the introductory courses a lack of consensus among the students about problems. Indeed, many of these students are not particularly interested in the meetings as they do not feel a particular commitment to the course. However the reps themselves have found the meetings stimulated their interest. All students have expressed enthusiasm and appreciation that the staff feel students' opinions are important. The staff have also been appreciative of a set forum to explain problems to the student – for example, the efforts that have been made to improve student accommodation within the department, the reasons for particular exam formats, timetabling problems and so on.

The lecture evaluation forms have been in use for more than a year, although they have been modified during that time. An initial analysis shows that they have been generally well received by staff and students, and staff have found most of the comments fair. On three occasions only have students made comments which could be considered tactless or rude, and on further investigation some deeper problem was found in each case. It became apparent that many students did not realise how much some staff took their results to heart and how upset they could be by thoughtless remarks!

Some questions have obviously been of more relevance to some courses than others. 'Audibility' for example is more of a problem with the introductory courses in large lecture theatres than with the small honours classes – though one student experiencing hearing difficulties was identified in the latter. References, on the other hand, are of more importance at advanced level since most basic work is adequately covered in the recommended textbooks.

It is still a matter of debate whether students should be required to sign the forms. While accepting the view that no one should make comments they do not feel willing to put their names to, there is a real problem that occasionally staff could become vindictive towards a student who had given him or her a 'bad press'. Our current policy is that students should be encouraged to sign but not compelled, on the understanding that less notice may be taken of unsigned comments. In general students have not been reluctant to sign the forms.

The interviews have been appreciated by the students although for some reason they seem to dread them. For this reason it is

important that the staff involved are well known by the students and that the setting is informal. It would be impracticable to implement this system for large classes because it is quite time-consuming, but it is a good place for problems to be aired which the student may not wish to discuss in a more public setting.

CONCLUSIONS

Obviously, no system is going to solve all possible problems. However, these three innovations – the staff-student liaison committee, lecture evaluation and individual interviews – have been of great use in improving staff-student communication, giving students some element of control over the ways in which they are taught and the feeling that their views are important, and helping in staff development. The students have certainly grown in confidence about approaching staff. The evaluation summaries could also be useful to course organisers in maintaining their overall view of course structures. Many teaching departments do include some of these elements to a greater or lesser extent but those that do not should seriously consider introducing them. They do not take up much staff time and are very beneficial. ※

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Alligation Revisited

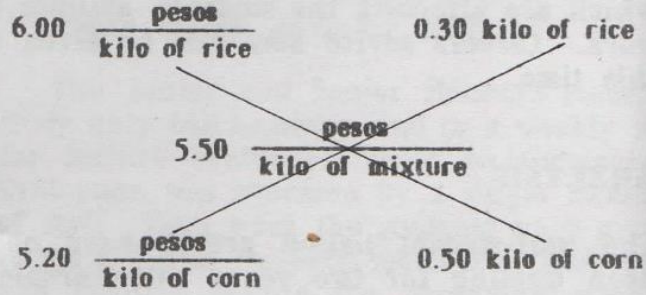
Moises S. Soriaga

Problem solving is an integral part of chemistry and of its instruction. The correct solutions to various quantitative problems have corresponding steps or methods which, if simple, are preferred. Is a direct, algebraic approach always the best way? Or are alternative approaches better sometimes?

Alligation is algebraically derived and designed to facilitate the solving of certain problems on mixtures. I have used it profitably over a wide range of problems involving dilution, isotopic mixtures, alpha-beta anomer equilibria, monomer-dimer systems, analytical constants of oil blends, dissociation effects on gas densities and average molecular weights. To illustrate its use better, some sample problems are presented here.

Example 1 If corn is ₱5.20 a kilo and rice is ₱6.00, how much of each is needed to make a mixture costing ₱5.50 a kilo?

By alligation



The author is a Professorial Lecturer of the Department of Chemistry, University of San Carlos, Cebu City.