

Theme : Formal Education

Sub Theme : Quality Issues

## **Enhanced Quality and Success in Sri Lankan non-University Institutions through intermediary and Innovative approaches involving hybridised ODL Methodologies**

J N Oleap Fernando

Honorary Dean, College of Chemical Sciences, Institute of Chemistry Ceylon

Formerly Senior Professor of Chemistry, The Open University of Sri Lanka

Adamantane House, 341/22, Kotte Road, Welikada, Rajagiriya, Sri Lanka

(email: oleap@iname.com)

### **INTRODUCTION**

The author has been involved since 1979 in teaching Chemistry at the B Sc degree level to students in two non-conventional programmes. He has also been involved for 44 years of his academic career in teaching Chemistry to B Sc students in many conventional Universities in Sri Lanka and Papua New Guinea. Over the past four decades varied experiences have been thus obtained in both “teacher centered” and “student centered” teaching/learning approaches to a wide spectrum of students in many tertiary level programmes. This paper discusses the results of studies conducted over five years with a view to enhance quality and success in a non-University Sri Lankan institution, namely the College of Chemical Sciences (CCS) of the Institute of Chemistry Ceylon, which is the professional body catering to the profession of Chemistry in Sri Lanka. The 32 year old Graduateship Programme of the CCS at an academic level equivalent to an Honours Degree in Chemistry from a University has now become an integral part of Sri Lanka’s tertiary educational scenario: it not only produces the largest number of Graduate Chemists in Sri Lanka but also passes out as many as are produced by all the Sri Lankan Universities put together. Intermediary and innovative approaches involving hybridized and mixed ODL Methodologies have been adopted to enhance quality and success at the CCS. The author has used his 25 year old experience in distance education at the Open University of Sri Lanka (OUSL) to strengthen ODL by consolidation & coordination of experiences in teaching Chemistry into a more productive teaching/learning mode that makes use an optimal mix of the finer elements of ODL and face to face instruction.

### **PERSONAL EXPERIENCES IN NON CONVENTIONAL TEACHING ( OPEN & DISTANCE/ FACE TO FACE)**

Over two decades of Open & Distance Teaching at the OUSL has necessitated the author to write distance teaching material in the areas of Basic Thermodynamics (first year), Applications of Thermodynamics (second year), Advanced Thermodynamics (third year) and Surface Chemistry (second year): such material has been profitably used by many students to obtain the (three year) B Sc degree through distance learning methodology at the OUSL; these students are not exposed to any face to face lectures apart from day schools, discussion classes, counseling sessions, assignments and practical classes. Despite a considerable attrition rate particularly in the first year, a reasonable number of students have been successful in achieving their goals, upgrading their existing status and realizing their desired career re-development aspirations. However many students, even amongst those who have been successful, have been unable to make maximum use of the ODL method due to “surface learning” which may be explained as learning devoid of deep understanding and conceptual learning; such students are content to undertake only a cursory study geared not towards true learning through the recommended ODL techniques but merely short term goals such as answering assignment tests and passing final examinations. It is ironic that the ODL method that has proved itself to enhance access to education at one's own pace, place and time in a meaningful way is undermined thus obtaining minimum pedagogical benefits. A principal reason for this is that such students, for various reasons, read the OUSL study material only as the last moment just prior to a test or examination. Motivation to change such an approach is imperative in an ODL context.

The author has also been involved in teaching Chemistry through the conventional (lecture) method over 32 years to students following the Graduateship Programme in Chemistry of the College of Chemical Sciences (CCS). This unique programme caters very well, to fairly large numbers, many of whom though qualified are unable to find admission into the very competitive non-fee levying state University system in Sri Lanka as well as those in middle level employment who wish to upgrade themselves. The author has been delivering lectures in thermodynamics and surface chemistry to these students and covering basically a course content that is very similar to that dealt with in the Distance Education study material of the OUSL BSc degree programme and referred to in the previous paragraph.

### **MODIFYING THE TEACHING SYSTEM TO ENHANCE QUALITY AND SUCCESS**

The author thus has the unique experience of simultaneously teaching similar students in two non-conventional environments but using different study modes: the ODL method at the OUSL and the face to face teaching method at the CCS. The general lack of time available and/or surmised to be available by both types of students unfortunately resulted in a considerable degree of rote and surface learning. Despite CCS students having more face to face contact with lecturers, the general performance of a fair number of students was not very much different to similar OUSL students and resulted in a considerable attrition rate amongst CCS students as well. This paper presents the attempts of the author to make the teaching system more productive, particularly for average or below average students. Enhancement of self centred learning and inculcation of better reading habits amongst face to face learners at the CCS with the ultimate objective of enhancing quality and success rate have been rewarding additional benefits of this modified ODL methodology.

The author therefore decided initially to investigate firstly whether the more regularly available CCS students could be facilitated to improve their learning skills in a more constructive manner by using a hybrid/resonance mechanism involving both lectures as well as the ODL mode. The Thermodynamics course followed by CCS students in their first two years in two lots of 14 & 12 lecture hours appeared to be ideally suitable for this purpose since basically the same content was available as the printed ODL course material used by the OUSL students.

New students admitted into the first year of the Graduateship Programme of CCS for the past 5 years have been issued the OUSL study material in advance of their lecture sessions but in small lots. These students, to whom ODL was a completely unknown mode, were told to read the relevant modules and understand them, on a distance study basis, before they came for the lecture session; they were requested to come to the "lecture session" ready with difficulties and questions to be clarified by the author at the face to face session. The students were told that the author will only deal with the basic as well as more difficult topics as formal lectures during the scheduled "lecture sessions," which he intended to use more for discussion and problem solving; they were also told that they should be able to confidently read, study and understand the OUSL study material at their own time, place and pace without much difficulty since OUSL students did so on their own without even having the benefit of a lecturer assisting them regularly. In the first four years (2005-2008) the author found, that a majority of students had not carried out the instructions given and were still expecting the conventional lectures. (A subsequent feed-back conducted amongst the students revealed that while over 80% of the students had attended more than 95% of the lecture sessions, only about 50% had read in advance even 50% of the study material given to them). This situation was not entirely unexpected since the availability of the customary number of hours for lecture sessions scheduled perhaps gave the feeling that the conventional lecture may nevertheless be delivered while they could read the distributed OUSL material for greater understanding subsequently. Thermodynamics being generally having a notoriety as a difficult and somewhat unconventional/abstract macroscopic approach to the study of matter and also needing the use of some high school Mathematics perhaps aggravated the situation even further.

The author was therefore compelled, in the interest of the students, to face reality and alter his original strategy fairly early in the "lecture sessions": in addition to the topics which he was intending to lecture on, he was compelled to continue to resort to the lecture method to cover about 85% of the study material. The students were however deliberately not formally lectured to on about 15% of the OUSL study material content and were requested to read and understand that on their own using the distance study approach. Problem solving by the author attempted to answer most of the student queries in these areas without serious difficulty. A practice test conducted towards the end of the teaching session indicated mixed results which were however not disappointing. The results of student performances at the final examination was not discouraging.

## **CONTINUATION OF THE HYBRIDISED ODL MODE IN THE PAST TWO YEARS**

Despite the slight set-back amongst first year students referred to above, the author has continued with the method over the past 2 years as well (2009-2010) with increased success. At the request of students and taking into consideration the results of an anonymous feed-back at the end of the course in 2009, the OUSL study material was issued much earlier to enable students to read them more flexibly.

The 2010 course & examination have just been completed and the results of a feed-back is very encouraging. In the midst of all the problems they encounter due to part time employment and involvement in other educational courses as well by some of the students, 69% have reported that they read over 50% of the OUSL study material. Over 70% have given an excellent/very good/good rating to the OUSL study material; With 78% attending over 80% of the lectures and a further 18% over 60% of the lectures, 80% have recorded that the motivation to attend the lecture did not diminish in any way due to the prior availability of the relevant OUSL study material in their hands. This data is a distinct improvement on the situation that existed with the previous first year students. The author was able, for the first time, to conduct the questionnaire just after the final examination and this has enabled him to obtain the feed-back that about 75% are expecting to get pass marks in the two relevant questions on thermodynamics in the final examination paper. It is also

comforting to note that over 95% are expecting to pass the overall paper in Principles of Physical Chemistry which contains questions on kinetics, phase equilibria and electrochemistry as well. The official results will take a further one month to be released after external moderation and it will be interesting to see how these results will compare with student expectations referred to. It appears that the hybridized ODL mode has paid dividends in the very first year as well. What is also very significant is the reply to the following question that was also asked in the anonymous questionnaire:

“ The lecturer proposes to conduct the second year 12 lecture course on Applications in Thermodynamics by adopting a similar procedure of issuing OUSL study material in advance. However, he intends to lecture only for 20% of the time. The balanced time is intended to clarify difficulties and answer your questions from the material read. What are your comments and suggestion regarding this?.”

The response to this question this year is much more positive and more encouraging than in previous years. While a very small minority are completely against and a few students would have no objection provided the 20% is increased to about 40-50%, the vast majority have referred to the proposal with great delight and have expressed the hope that the lecturer will use the time available in a problem solving manner. The author is extremely encouraged by what appears to be a more positive look at the hybridized ODL methodology which he has adopted this year.

The more philosophical spin-off-benefit possible of ODL being used to give even face to face students a much desired independent approach to their learning in which the teacher plays largely the role of a facilitator than the conventional teaching instructor cannot also be overlooked apart from the pedagogical and economic issue of reducing the number of lectures in the context of the prior hand over of OUSL distance study material.

### **INCREASED SUCCESS THROUGH THE MODIFIED TEACHING MODE IN RESPECT OF SECOND YEAR STUDENTS FOLLOWING THE COURSE ON APPLICATIONS IN THERMODYNAMICS**

For the past two years the author has been conducting his second year lectures on Advanced thermodynamics on an 50/50 basis :while all the OUSL distance study material was distributed in advance, half of it was , as announced, not lectured to formally while formal lectures were conducted on the balance half comprising areas that were perceived from past experience to be more difficult by the author. The results from the second year students was very much more encouraging and the author was able to get many students to raise queries and seek clarifications during the “lecture sessions”. The relevant “lecture sessions” were confined to providing such assistance only. The examination results indicated some degree of improvement from previous years ; interestingly, second year students appear to have more self-confidence & are reaping benefits from the consequent student centred approach . The feed-back that was obtained at the end of the course was also much more encouraging and students were generally much more appreciative of the “dual” approach as compared to responses in the previous year.

The author is therefore more confident now to repeat the experiment for the fourth consecutive phase in the next academic year. However, this time round it will be done in fuller measure as originally planned but adopted only on a 50/50 basis in the second and third phases of study. It has thus been now firmly decided that ,by and large, second year students following the “Applications in Thermodynamics Course” will be expected to depend entirely on the OUSL study material on the distance study mode on the basis of only 20-30% of formal lectures being conducted.. . The students will be adequately advised about this approach and system at an orientation lecture that will precede the formal commencement of the course., 70-80% of which will be confined to discussion, answering student queries and problem solving exercises. The OUSL material will be issued well in advance of the lecture session. Students will then be expected to go through the material which would have been covered in their lecture session , study and understand it as much as possible in a distance study context. They will consequently be expected to come up with queries based on difficulties encountered during their study of the OUSL material. The scheduled “lecture sessions” will thus for the most part be used to answer student queries and carry out problem solving exercises on the basis of problems that will hopefully be surfaced by the students. The more encouraging response received from the first year students recently will no doubt be the spring board for this exercise.

### **CONCLUSION**

The author is convinced that the hybridized ODL methodology adopted by him five years ago with subsequent modifications has been extremely useful and productive not only for second year students but also for first year students. Based on feed-backs the original methodology has been periodically amended based on student needs & desires but with the ultimate objective of encouraging more and more of student centred learning through hybridized ODL methodologies geared towards enhancement of quality and success. Such consolidation. of OUSL study material with face to face classes in the CCS in an innovative & collaborative manner is expected to bring a successful learning approach amongst the students. The experience gained thereby could hopefully be used to extend this modified dual approach to other courses in the CCS Graduateship Programme in the years to come. It may also be possible to have a lesser number of scheduled “lecture sessions” in the future since in the intended dual approach it may not be necessary to have as many hours

scheduled as it used to be when formal lectures were conducted without the distribution of OUSL distance study material.