IN HOUSE TRAINING MODULE FOR FACULTY & A CASE STUDY

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1. PREAMBLE :

An attempt is being made to identify the training needs for the faculty to help institutional academic and administrative processes. The FACULTY constitutes personnel of the College who take part in imparting education.

Faculty can be further divided broadly into 3 categories namely (i) Senior most teachers who have put in service more than 20 years (ii) Senior teachers who have put in service more than 10 years and less than 20 years and (iii) the rest. The major teaching load of the system is being shared by the teachers of third category who have teaching experience less than 10 years. The teachers in the first two categories take part in administrative matters in different levels.

The Centre has conceived to organise two types of programmes. The first one on Effective Teaching and the second type on Decision Making, Leadership and Cost Consciousness with the intention that the teachers with less than 10 years of experience should be trained with respect to Effective Teaching, whereas teachers with more than 10 years of experience should be given training with respect to Decision Making, Leadership and Cost Consciousness. This exercise is a part of the Project on Integrated Faculty Development.

2. PROGRAMME ON EFFECTIVE TEACHING

Accordingly, during the years 1992/93, training programme on Effective Teaching was organised in 3 batches for teachers with experience less than 10 years including both permanent and contract teachers. This facility was extended to the Visiting Faculty also. The total number of teachers trained was 68.

The methodology adopted was to start the programme with video recording of the lectures delivered by the participants to fix the initial level for the programme and then followed the inputs regarding Instructional Objectives, Principles of Learning and Instructional Methodology. The last session of the programme was to video record the lectures delivered by the participants. It was noticed a marked improvement in the performance of the participants as compared to their respective initial levels.

Updation of the scholarship and the need for instructional objectives were the issues given primary importance during the programme by the resource person. Heads of the departments gave lectures regarding the duties and responsibilities of teachers. A lecture by the Head of the Institution (Principal) was delivered in each programme about the objectives and the

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imperatives of the College, and what the institution expects from the faculty. At the end of the programme a feed-back session was arranged in which the Principal and other faculty were also present. Following are some of the outcomes of the Programme.

Direct Benefits : * Increase of the confidence level in the junior teachers.
* Improvement in the performance as teachers.
* Development of humility and desire to grow as a successful teacher.
* Removal of inhibition among teachers to interact in a group.
* Development of desire to update the scholarship.
* Development of professionalism as teachers

Spin off benefits :* Promotion of interdisciplinary interaction.
* Culture of Curriculum planning.
* Institutional understanding.
* Establishing Communication Links between the junior most and the senior most faculty.
* Purpose for the performance.
* Recognition of committed teachers.
* Development of desire to grow and contribute to the system.

The main resource person for all the three programmes was Dr.T.R.RAMANNA, UNESCO EXPERT IN CURRICULUM DEVELOPMENT AND PRINCIPLES OF LEARNING who designed the entire training programme on Effective Teaching.

3. POST SCRIPT

This exercise is a never ending process with on-line monitoring through follow-up meetings and informal discussions. The ambitious aim of this entire exercise is to evolve a committed group of young teachers as a curriculum development group in the College and to evolve a structured methodology for human capital development in the College.

During the course of the programme it was noticed that the Heads of the Departments during their lectures indirectly stressed on the need for well-defined objectives and structured methodology for development of departments in the College.

4. FOLLOW-UP ACTION

* Conduct of formal and informal meetings with the participants during the course.
* Conduct of brain storming meetings.
* Providing facilities like Xerox etc. to the teachers trained to experiment on pedagogy.
* A pilot case of implelmenting the inputs given in the training programme in the classroom situation.

Accordingly Mr.R.S.Anandamurthy, Lecturer in Electrical Engineering who attended the training programme is taken as the pilot case to develop a pedagogical model to teach Power Electronics.

The experiment in Pedagogy conducted by Mr.R.S.Anandamurthy with respect to teaching Power System Analysis and Power Electronics is only a first step towards the design of curriculum in the subject which did not involve the participation of user system and others directly or indirectly. Obviously further steps would be to conduct the experiments in teaching the same subject on a broader canvas embodying the several parameters like the participation of the user system, future trends in the proliferation of knowledge etc.

A detailed report of the pilot case is presented in what follows :

5. OBJECTIVES :

In any system of technical education there are three main aspects to be stressed : (i) Giving the student a firm theoretical foundation; (ii) Reinforcing fundamental principles taught in theory by conducting appropriate practical work in the laboratory; (iii) Giving an opportunity to the student to solve real life problems by giving suitable project works. In this study, an attempt has been made to develop a model pedagogy in power electronics considering the three aspects given above.

Objectives of this study are :-

(i) To prepare instructional objectives for teaching a basic course in power electronics.
(ii) To prepare structured instructional material for conducting laboratory work in basic power electronics.
(iii) To prepare project briefs in power electronics to help students select projects in power electronics.

6. THE INPUTS

As mentioned in para 2 during the training programme, the following decisions were taken :

1. Instructional objectives written in measurable terms should be provided to the students before starting a course to make teaching more effective.
2. Relevant question banks should also be supplied to the students to enhance student participation in problem solving.
3. As far as possible, teaching aids like over head projector should be used in class room to make learning more interesting and teaching more efficient.

Before these resolutions were implemented, the following questions were to be answered :

1. *Do students find instructional objectives and question banks useful ?*
2. *How to supply these materials to the students ?*
3. *What practical difficulties might be encountered in implementing the resolutions mentioned above ?*
4. *Will implementation of these resolutions improve the quality of teaching in this institution ?*

In order to answer these questions it was necessary to conduct trials in implementing these resolutions in one of the classes and to find its impact on the efficiency of teaching. Hence, the following two trials were made : (a) Teaching Power System Analysis, and (b) Teaching Power & Industrial Electronics. Both of these trials were conducted on the same batch of students by the same teaching faculty. The paragraphs below show observations made by the faculty member after conducting these trials.

Teaching Methodology Before Training

1. Instructional objectives written in measurable terms were not suplied to the students before starting a course. However, objectives were stated in each class. Due to this, the students or teacher could miss some of the objectives in course of study.

2. Bank of questions/problems was not given to the students before starting the course. But problems were taken from

relevant texts. The teacher solved most of the problems in the class. Due to this there was very little student participation in the class room.

3. Due to the facts mentioned above, teaching was less structured, more time consuming, and less effective.

Teaching Methodology After Training

As mentioned earlier, a modified teaching methodology was adopted after the training, to teach two subjects, namely, Power System Analysis and Power & Industrial Electronics.

(a) Teaching Power System Analysis : 1. Instructional objectives written in measurable terms were supplied to the students for each chapter before commencing it. Objectives were framed as per prescribed existing syllabus for the course.

2. Bank of questions / problems could not be prepared due to shortage of time. However, a collection of problems was prepared for some chapters and given to the students. Problems were compiled from recommended texts for the course.

3. Copies of instructional objectives and problems were supplied to all the students free by C.E.R.T. *(students do not realize the cost involved if these are suplied free).*

4. Majority of students welcomed giving instructional objectives.

5. Class room teaching became more structured after instructional objectives were given to the students.

6. Lesson planning as per format specified in the teachers training programme could not be done because of unexpected holidays due to students' strike and social disturbances.

7. Over head projector could not be used in spite of preparing transparencies because the room assigned, R12, for this class was not suitable for this. It was not possible to change the room in the middle of the semester as rooms suitable for using over head projector were not available.

8. Student feedback regarding new teaching methodology was not obtained because the new methodology had not been implemented to the satisfaction of the teaching faculty.

NOTE : Appendix-I shows instructional objectives and collection of problems prepared for teaching Power System Analysis.

(b) Teaching Power & Industrial Electronics : 1. During vacations between semesters, instructional objectives were written for the entire course based on the prescribed syllabus.

2. A bank of questions/problems was also prepared during vacations. Questions and problems were complied from previous question papers of the university examinations. *After preparing this bank, it was observed that many questions and problems were of inferior standard and did not test student's abilities as per instructional objectives.*

3. Since computer facility and staff to prepare teaching materials was not easily available, facilities outside the institution had to be used. If the following facilities are made easily available in the institution, preferably at C.E.R.T. preparation of course materials and teaching aids will be much easier :

* IBM Compatible PC/AT (at least 386) with good graphics monitor and adaptor.
* Post Script laser printer with at least 2.5MB RAM
* Good wordprocessor / DTP programme

which can handle tables and graphics.
* A hand held scanner for scanning drawings.
* Staff trained to operate these.

4. A few copies of instructional objectives and question bank were provided by C.E.R.T. The students were asked to copy these.

5. The college Time Table Officer was asked in advance to allot a room suitable for using over head projector. So, there was very little difficulty in using over head projector. This made teaching more effective and efficient. Use of over head projector made revision of topics much easier and faster, presentation of complicated drawings/waveforms more accurate and less time consuming.

6. Since question bank was given to students in advance, it was possible to ask students to solve some of the problems given in the bank. It was not necessary to dictate problems in class. This saved time and enhanced student participation in the class.

7. An attempt was made to integrate class room teaching with laboratory work. Instructional material for laboratory work was also supplied to the students. Students were asked to write theory relevant to each experiment. The purpose of this exercise was to motivate students to make use of library facilities.

8. At the end of the semester, student feedback was obtained regarding implementation of new teaching methodology.

NOTE : Appendix-II shows instructional materials prepared for this course. Appendix-III has a copy of Student Feedback Form.

Summary Of Student Feedback

Total number of persons responded : 33 (boys :25; girls:8). Total Strength : 38

In the summary given below, the number in parenthesis indicates the percentage of responses taking 33 as base.

QUESTIONS RELATED TO TEACHING METHODOLOGY

1. Providing written instructional objectives for a subject before starting a course is :
   (a) extremely helpful (55 %)
   (b) marginally helpful (45 %)
   (c) of no help (0 %)

2. Clear statement of instructional objectives
   (a) enhances learning skills (85 %)
   (b) does not enhance learning skills (15 %)

3. What do you prefer ?
   (a) Instructional objectives/question banks sold by C.E.R.T. at a nominal price (70 %)

(b) Your copy instructional objectives and question banks from a master copy (27 %)
(c) Your representative copies instructional objectives/question banks for you (9 %)

4. Instructional objectives
   (a) must be given for all subjects (55 %)
   (b) should not be given (0 %)
   (c) not necessary for all subjects (45 %)

5. Use of over head projector by the teacher

(a) makes learning easier and interesting (67 %)
(b) does not make learning easier and interesting (9 %)
(c) is more helpful to the teacher than to student (30 %)

6. What are the most frequent factors which make classroom teaching less effective ?

(a) Lack of involvement by the teacher (33 %)
(b) Lack of involvement by students (52 %)
(c) Noise pollution due to factors outside classroom (21%)
(d) Nonavailability of teaching aids like over head projector (6 %)
(e) The teacher does not make the purpose of learning clear (33%)
(f) The subject is irrelevant to the branch of engineering chosen by the student (21 %)
(g) Any other factors (21 %)

NOTE : Majority of the responses given under (g) above indirectly indicate that the teacher does not make the purpose of learning clear.

7. Frequently teacher is not able to complete teaching all the topics mentioned in the syllabus because.

(a) he/she does not organize teaching well (39 %)
(b) he/she is not punctual (6 %)
(c) he/she is not provided with teaching aids like over head projector (9 %)
(d) he/she wastes time in the class room in giving notes or otherwise (21 %)
(e) contact hours are lost due to frequent holidays/letoff (42 %)
(f) the syllabus is very exhaustive to be completed in the available time (61 %)
(g) Any other factor (0 %)

8. Which type of test, do you think, effectively measures knowledge of a student ?

(a) Assignments (24 %)
(b) Open-book test (15 %)
(c) A strict closed-book test (46 %)
(d) Viva voce (51 %)

9. What should be the frequency of tests ?

(a) 1 test per month (64 %)
(b) 2 tests per month (30 %)
(c) 4 tests per month (3 %)
(d) 1 test per semester (3 %)

10. Teaching should always aim at

(a) making students pass examinations (21 %)
(b) making students understand fundamentals of the subject (88 %)

11. Suppose students are asked to write relevant theory for experiments

(a) it increases confidence of the student to conduct the experijment (70 %)
(b) it does not help the student (15 %)
(c) it makes the teacher's job easier (9 %)
(d) it makes the teacher's job more challenging (6 %)
(e) it motivates the student to spend more time in the lab than usual (21 %)

12. For laboratory work, as per university syllabus,

(a) the time allotted in the timetable is

sufficient (24 %)
(b) the student must be allowed to use lab facilities whenever he/she wants (76 %)

13. Teaching methodology adopted to teach Power & Industrial Electronics aimed at integrating class room teaching with laboratory work. In your opinion, the objective of integration has been
(a) achieved (27 %)
(b) moderately achieved (73 %)
(c) not at all achieved (0 %)

Conclusions

From the student responses given above, the following conclusions can be made :

1. Majority of students feel that written instructional objectives for each course should be provided before starting the course.
2. Clear statement of instructional objectives makes teaching more effective.
3. Instructional objectives/question banks should be prepared and sold by C.E.R.T. at a nominal price.
4. Use of over head projector by the teacher makes learning easier and interesting.
5. The following are the factors arranged in order of decreasing importance which frequently make class room teaching less effective as perceived by students :
(a) lack of involvement by students,
(b) lack of involvement by the teacher,
(c) the teacher does not make the purpose of learning clear,
(d) noise due to factors outside the class room,
(e) the subject is irrelevant to the branch of engineering chosen by the student,
(f) non availability of teaching aids like over head projector.
6. The following are reasons arranged in order of decreasing importance for teacher's inability to complete teaching all topics mentioned in the syllabus :
(a) The syllabus is very exhaustive to be completed in the available time,
(b) Contact hours are lost due to frequent holidays/letoff,
(c) The teacher does not organize teaching well,
(d) The teacher wastes time in class room in giving notes or otherwise,
(e) The teacher is not ovided with teaching aids,
(e) The techer is not punctual.
7. Fair evaluation of a student can be made only by conducting a strict conventional test or viva voce.
8. Majority of students prefer one test per month.
9. Most of the students feel that teaching should always aim at making students understand the fundamentals of the subject.
10. Asking students to write theory relevant for laboratory experiments enhances student's confidence to conduct the experiments.
11. Most of the students feel that each student must be allowed to use laboratory facilities whenever he/she wants.
12. Majority of students feel that integration of class room teaching with laboratory work was achieved moderately.

Further Scope

Teaching methodology adopted in this trial can be refined further to teach all subjects. This improves teaching efficiency. However, the main constraint is that instructional objectives are to be framed as per syllabus prescribed by the University.

Due to this integration of laboratory work with theory classes becomes difficult when experiments mentioned in the laboratory syllabus have no correspondence to the theory syllabus and when laboratory work and theory related to that are not taught in the same semester. Effective teaching can be done only after meticulous planning, not only by the teacher but also by the top level management. Ad hoc arrangements in assigning subjects to teachers, nonavailability of teaching aids, and ill-planned class rooms can deteriorate the quality and efficiency of teaching in spite of sincere efforts put by the teacher. The management should recognize efforts put by the teacher to improve class room teaching and reward such efforts by proper incentives. This helps in creating a quality conscious culture in the institution.

In our system, inevitably contact hours are lost due to scheduled and unexpected holidays. Due to this, it becomes difficult to complete teaching the entire syllabus in spite of good planning. The only way to solve this problem is to augment the quality and quantity of information transferred per contact hour.

If instructional objectives and question banks are prepared for all subjects, the next step would be to prepare instructional materials/handouts for all the courses.

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Editor