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Communication in Engineering Pedagogy

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Abstract:

The present paper deals with the problems that are encountered during English training of first year students in the Engineering colleges of Madhya Pradesh. The methods to infuse language skills at all levels have been discussed along with tools of communication in detail, to suit engineering students. For assessment of English competence, some established rubrics have been dealt superficially. Focus has been on integration of engineering education than considering Communication Skills as a part of engineering.

COMMUNICATION – AN INDISPENSIBLE SKILL

Communication Skills are considered to be valuable career enhancer (1). It is no wonder that they consistently rank among the top three skills essential to the profession. In the passing years, communication has rapidly evolved and incorporated many different domains making it more essential for an engineer to upgrade himself. These domains include premium located meetings, digital literacy including, e-mail and texting, social media and virtual environments. Further on job, an engineer has to averagely communicate at various levels with colleagues, employers, managers, clients, media and general public.

Though most talked about yet these skills are side tracked, when it comes to application by Engineering Graduates. Realizing this, in Hyderabad, a decision has been taken this year by technical education department to undertake a major overhaul of the curricula in Engineering Colleges.

The decision to usher in reforms i.e., to focus on English Skills, has been taken even as the National Association of Software and Service Companies (Nasscom) has pointed out that only a small percentage of Engineering graduates who pass out of state colleges make it big in the job market. The percentage of students who remain unemployed even after getting a B.Tech.or B.E. degree is over 50%, Nasscom has pointed out (2).

CURRENT SCENARIO OF ENGINEERING

There are ample evidences that graduate engineers lack the required skills when compared to the needs of academia and industry internationally (3).

In India, with burgeoning Engineering colleges and competitions soaring high, the problem is further aggravated with mass turn-over of half-chiseled, result oriented, raw techno graduates who are untrained in the regular grooming and communication skills.

In the Engineering curriculum of Madhya Pradesh Colleges under Rajeev Gandhi Technical University, the subject has its roots in the first year only. The other semesters have a class of Self study and Group discussion as a mere formality in their curriculum, most of which is conducted by a technical personnel. During initial years, the entrants are introduced to formal business communication and taught oral skills through computer assisted language learning (CALL). The students are programmed to score grades for a written exam along with a practical for oral assessment. With such a mindset of scoring average grades and clearance, they are pushed into higher semesters with fully loaded syllabus of technical subjects. These standalone subjects give students exposure to the technical world but fail to target the expression skills of the students.

Further, the situation worsens when mindsets of Engineering faculty and students are explored, as they have mild response towards 'learning English'. Probably, numbers, machines and designs have lured them to engineering and they detest learning appropriate usage of a language – no matter how important it is?

Inadequate and ineffective soft skills are badly – badly reflected in them equally as an individual or as a professional. This boils down to affecting their recruitment and retention in Engineering Profession (6). Speaking English and expressing rightly with proper attitude does not come naturally to them as all of them has grown into them as a habit.

During Campus Placements in the Pre- final year, unfortunately, only handful of students reach the benchmark of placement selections, offered by core or software companies. These companies have, time and on, given active feedback to placement cells of colleges. Let it be a

batch of 60 students. It can be assumed that out of them, 10 can be considered as Institute ready professionals, 20 can be considered technically weak, 22 lag in Communication skills and 8 can be deemed unfit for Technical education altogether, on the basis of their overall skill assessment (Based on oral data collected from 4 placement cells by the author).

PROBLEMS ENCOUNTERED DURING TRAINING SESSIONS

Heterogeneity of a class room, particularly in the first year for a language trainer is a matter of concern. He finds it difficult to bring his trainees at the uniform level, to proceed further.

Students from rural background need basic level of communication that students from urban background have already mastered. In urban school pass-outs yet again, a clear demarcation exists between students who have difficulty expressing themselves due to social barriers or underdeveloped communication skills and those who have sufficient command over the language. The latter are those who could be exposed to business communication.

Instead, when the entire lot of students is subjected to uniform assignments based on general syllabus, the class is split in response. Due to coping of troubles, some 5% quit classes, 70% passively take down notes to clear their written papers and only 10% actively come to terms with the syllabus and participate in the sessions.

The last lot of active ones, identified by the instructor, is split further into Interested and Not Interested ones. The latter group has negative attitude towards the subject despite right subject knowledge and skills, they are reluctant to share their ideas and appear uninterested during the sessions.

Further, the course content is kept in one slot of one year only and is not clearly defined in certain areas. Interpretation by various instructors is done as per their suitability and not keeping in view, the learner's level.

Teaching methods are transitional, basic with Black board teaching or advanced through Computer Assisted Language Learning (CALL). Though Language lab is equipped with

learning software but inert and passive exercises do not bring out the required language potential of the students, by targeting their behavioral intricacies and individualistic errors.

In theory classes, learning is controlled and restricted by time bound syllabus. On campus, students hardly get opportunity to practice communication skills, due to lack of intrinsic motivation.

Teaching of language needs to go beyond classrooms and should spread on campus. Linguistic ability should be ingrained in students early on and should develop with years as a lifelong learning process.

INFUSING LANGUAGE SKILLS

The techniques of language i.e., LSWR (Listening, Speaking, Writing and Reading) can be integrated in all the four years of engineering with various modules to suit the heterogeneous lot.

First year may target Basic English with modern usage, small routine conversations, syntax, and right pronunciation with drills to bring out fluency in students. In written segment, informal letters, notes and reports, stories and essays can be given. Students at higher level may be introduced to advanced versions of these sections. They can be made group leaders assist the weak lot.

Second year can be experimental for trainees where they collaborate with technical teachers for students' up gradation. Oral presentation sessions are made interdisciplinary, terminology of technical subjects introduced herein, projects of technical writings can be allotted to students by Technical Teacher Trainer Group.

The third module can focus on personality development and attitude awareness. This concept would create insights in students to deal with their own psychology, interpersonal communication and ways to crack interviews.

At the final stage, a package of competitive edge can work well if course structure has simulated corporate situations, mock tests, on-line and rigorous training sessions to make

industry ready professionals. Panel of teachers can devote solely to nurture inherent qualities of students and provide them finesse for ultimate placements. Such a concept can streamline the existing system of language in skill training.

TOOLS OF COMMUNICATION

A trainer has certain instruments meant to hone linguistic abilities like role-plays, discussions, peer reviews, presentations, video play-back, vocabulary flash cards etc. Real life situations are created in class-rooms. After tasks whether individual or group one, the trainees are evaluated on established rubrics.

Teaching methodology has to reach an advanced level where the arrangements are flexible to fit in task requirements. Such tools have to be used with planning and caution for engineering students. If they are directly brought to the task, their response would be not so encouraging. Further, linking these tools to marking system and certificates based tasks, would lure the would-be engineers.

Presentation of projects, major or minor, must have a panel of technical and communication trainers. The skill requires content preparation, delivery and handling query sessions. Technical projects must be categorized from simple to difficult ones and time range can vary from 5 to 15 minutes. Slides can range from 5 to 15 minutes. Slides can range from normal professional slides to flash films. When the teacher panel would include a software expert to deal with computer solutions, the students would creatively experience a ‘corporate board room feel’ in the class.

For role plays, pseudo situations like board meetings, mock interviews, advertisement campaigns, media talk shows, R&D lab sessions can be created to transport the students to ‘on job’ situations. Written tasks must be re casted for real world needs. They must practice writing to external high end agencies.

A tone of formalism must seep in discussion topics where engineers deliberate on general, social, ethical, political or technical heads with effective ease. They must be given inputs to move from being a novice to become a professional.

Panel discussions or peer reviews can be carried out with discretion. Feedbacks can be quite constructive and honest when they come straight from the peers. The receiving students would think about the exercises more deeply and recognize other persons' point of view. In turn, the peers come to realize the means and ways of constructive criticism. Group reviews with clear guidelines can be regarded well than individual reviews as they reduce biased judgment to some extent (4).

It has been experienced that Audio-video recordings of known entrepreneurs, academicians, technocrats, scientists, engineers or ergonomists when played, aid in Knowledge base enhancement and Nonverbal training for students. They go for content analysis, criticism and reviews to hone their listening, analytical and expression skills.

Recording of student performances can be stored on earmarked systems for them to replay and understand the nuances of the language. Usage of current technology ranging from net services to office software can bring about substantial change in a learner. He gets virtual experience of being on job and his conduct and bearing transform thereafter.

Alternative texts (Science fiction) can be indirectly introduced for the students to give them expression skills through literature. (5)(6).

Engineering curriculum should focus more on design projects, lab reports and also on group reports as effective assignments for incorporating process skills. Process skills are more important than technical skills and comprise problem solving, team work, oral communication, professional ethics, writing skills and use of personal computer tools. Thus, combination of human and machine elements at inter-disciplinary level can produce well-rounded chiseled and integrated professionals that the job market is vying for.

ESTABLISHED RUBRICS FOR EVALUATION

It is significant to note that the sessions would hold no meaning unless backed up by established and objective rubrics for evaluating students. They enable the academician to impartially compare communication skills of students. Otherwise, subjective assessment leads the students to feel that they are being assessed unfairly.

Any instrument has some parameters and grade points. Let's say, for GD, it can be communication skill, knowledge, leadership trait, team working ability and nonverbal assessment. Now immediate objective and constructive feed-back becomes a necessity. The trainer can also rework on the task and give constructive inputs. He can ask the performer to redo the task in an improved manner, later.

Crafting a scientific, objective and methodical rubric is a matter of challenge for the trainer. He can design pilot exercises for small samples of students for accuracy of results. Once convinced, the evaluation of large samples can be done by established rubrics. It would become an easy and invaluable way to provide the much needed feedback that students carve for.

Mentioned below are some parameters developed by Dr. Nicole Koehler and Dr. Rachael Hains-Wesson (7).

Parameters for Oral Communication

- Appropriate Vocabulary
- Empathy
- Use of Visual Aids
- Information on Slides
- Provision of Hand-outs
- Feed-back from audience
- Responding to questions
- Voice modulation and Tones
- Eye Contact and Body Language

Parameters for Written Communication

- Text Type (Report/ Case Study/ Essay/ Bibliography)
- Length of the Document

- Writing Style
- Structuring of Argument (Persuasiveness)
- Appropriate Level of Detail
- Ratio of White Black Space
- Fonts and adherence to reference conventions (APA, MLA, Harvard etc.)

Parameters for Interpersonal communication

- Emotional Intelligence
- Body Language
- Posture
- Sensitivity to audience
- Active Listening

INTEGRATION FOR ENGINEERING EDUCATION

An English culture in engineering education must seep in as an established norm, to get the desired level. Communication skills must serve as a part of the tool box for successful engineers. To build this confidence in inmates, the educators must identify some check-points where communication addresses technical solutions (8).

Mentoring students in engineering field does not guarantee professional success so introducing authentic communication exercises is the need of the hour. Let not the existing pattern be disturbed or newly constituted to accommodate the requirement. A slight reconstruction or make-shift is all that is needed to take communication cycles to students' technical work. Linking of both disciplines would enhance student quality and make them more employable. Subsequently, the best practices would be implemented in engineering discipline.

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