

Using Needs Analysis to Design a Student Centric English Curriculum for Engineering Students

Dr. Lovely John Menachery

Department of English, Hislop College, Nagpur, India

l.menachery@gmail.com

Abstract

This paper is based on a study of the effectivity of the engineering English curriculum at the level of the University, in helping students acquire academic and professional language competence. The study sought answers to whether the English Curriculum fulfilled the needs of engineering students by reviewing the objectives, syllabus, teaching methodology and assessment. The findings are based on the analysis of the engineering English course in Rashtrasant Tukadoji Maharaj Nagpur University and an analysis of the students' language needs using tools like Questionnaires, interview, and interactions. The investigation showed that the most important need of the students, teachers and employers was better communication skills. It is imperative to bring changes in the English course for engineers to retain its relevance.

Keywords: English curriculum, India, university level, Needs analysis, necessities, lacks, language needs, wants, curriculum

Introduction

As per the All India Council for Technical Education (AICTE), the apex body of engineering education, all engineering and technical institutes in India should have some mandatory social science subjects in their curriculum. Communication Skills is one of these compulsory subjects taught in the first semester of engineering education in the engineering colleges of Rashtrasant Tukadoji Maharaj Nagpur University (hereafter RTMNU). The objective of engineering English curriculum at the tertiary level is to produce students who are sufficiently proficient in English to cope with and succeed in their tertiary studies and be competent enough to meet the demands of a globalized workplace.

In RTMNU, as in universities across India, the medium of instruction for science and technology is English. Engineers must know English, to access subject knowledge; to keep abreast of the latest in their fields, and to gain employment. But the role of English language skills in science and technology appears to be underestimated.

Significance of the Study

Education should be flexible to meet the challenges of dynamic world making it relevant by serving the need of the hour with changing times. This study gains significance from the fact that undergraduate studies offer students the last opportunity to gain proficiency in English. The English language classroom can fulfill some of the student expectations like the possibility of improved employment prospects, enhancement of performance in technical subjects and the opportunity to acquire further knowledge. It is the responsibility of the formal educational system to ensure optimum language learning and development. To do this, a continuously updated curriculum is an imperative; a curriculum based on the language needs of the students. The word ‘Curriculum’ in this study is taken to mean the aspects of objectives, course content, teaching methodology and assessment. This study analyses the English curriculum to investigate the extent to which it caters to the language needs of the students.

Research Method

An analysis of the English language needs of the students and an evaluation of the extent to which it is fulfilled by the course was carried out with the help of questionnaires, interviews and interactions. Ten colleges were included in the study. Data were collected from 461 engineering students, 10 English teachers, 30 engineering professionals, and six training and placement officers.

A descriptive cum investigative research was used to obtain information concerning the current status of the English curriculum for the engineering students. The categories of informants whose information was crucial for the present research were students, teachers, training, and placement officers (TPO) and engineering professionals. Each college has a campus placement cell headed by a TPO. The TPO along with the team members, organize placement processes in coordination with the company representatives.

The English Curriculum was analyzed by studying different elements of the engineering English curriculum like the time assigned, content, objectives, materials, the teaching learning processes, and assessment using questionnaires which were administered to teachers and students.

The academic and professional language requirements of engineering graduates were gathered from engineering students, training and placement officers and teachers. The content analysis of fifty three job advertisements for engineers in the national English daily The Times of India – Ascent. This was supplemented by an assessment of real workplace language needs through feedback from engineering professionals. This study attempted to evaluate the different components of the existing engineering English curriculum, and also investigate the academic and the workplace language requirements of engineers to see if the former catered to the latter; if not, where the discrepancies lie. The language needs of the engineering students were assessed through needs analysis.

Needs Analysis

An ESP Needs Analysis (also known as needs assessment) is a device used to know the present and future language needs of the learners in order to develop courses that have relevance for the learner. The target English language needs of the engineering students were investigated based on features derived from Hutchinson and Waters (1987). They divide target needs into:

1. Necessities or ‘what the learner has to know in order to function effectively in the target situation’ (Hutchinson and Waters 55, 1987)
2. Lacks- refer to what the learner lacks, and
3. Wants –refer to what the learners wish to learn. This was carried out by:
 - a. Studying the objectives, course content, teaching methodology and assessment patterns prevalent in the affiliated colleges of the university.
 - b. An assessment of the English language needs of the students and an evaluation of the extent to which it is fulfilled by the existing engineering English curriculum was carried out with the help of questionnaires, focus group discussions, interviews and interactions.

Needs Analysis in the Present Study

Van Ek as cited in Savignon (2002) argues that “identification of learners’ communicative needs provides a basis for curriculum design. The needs analysis carried out in the present study (based on Hutchinson and Waters classification of needs) can be summarized as follows:

1. Needs Analysis of -
Language ‘necessities’ for employment.
 - Language ‘necessities’ of the situation
 - Language ‘lacks’ of students
 - Language ‘wants’ of students
 - 1.1. Language ‘necessities’ for employment was determined through:
 - Job advertisements for engineers
 - Views of students
 - Views of training and Placement officers
 - 1.2. Language ‘necessities’ of the situation was determined by:
 - Analysing workplace language needs from the views of engineering professionals
 - Collecting information on the academic language needs from students and teachers.
 - 1.3. Language ‘lacks’ of students were assessed through - Communicative Language Ability Test
 - 1.4. Language ‘wants’ of the students through a questionnaire.
The study sought answers to three research questions:

Q. 1. How is the engineering English Curriculum organized and what is its nature?

Q. 2. What are the language needs of the engineering students?

Q. 3. Do the different aspects of the English course, like the time frame, materials, teaching and learning processes, and assessment cater to the language needs of the students?

Findings and Discussion

The findings and discussions are divided into three parts in consistence with three research questions.

Organization and Nature

In RTMNU the teaching of English is limited to the Communication skills module in the first year and a functional English module in the third year of engineering. The curriculum (Scheme of Examination and Teaching for Bachelor of Engineering) prescribes two contact hours per week which for English. The syllabus is a mix of reading texts, grammar, composition, and usage. The learning resources used in the English classes are the prescribed textbooks. The materials prescribed for study can be called eclectic, as it is a mix of technical writing, grammar, and a text on the principles of public speaking. The aim of the course appears to be to prepare students for the placement interviews.

Language Needs of Engineering Students

The language needs of engineering students as stated earlier, are discussed under language ‘necessities’ for employment, language ‘necessities’ of the situation, language ‘lacks’ of the learner group and language ‘wants’ of the learner group.

A. Language ‘Necessities’ for Employment

The information on the language necessities of employment were gathered from job advertisements for engineers in a newspaper (over a period of one year); an approach similar to what was used by P’Ryan (2011), the students, technical subject teachers (TSTs) and the training and placement officers (TPOs) of different colleges.

The content analysis of job advertisements for engineers revealed that irrespective of the posts advertised, or the branch of engineering required, fluent written and spoken English (23.88 percent) and good communication skills (22.38 percent) were the most sought after skills. Among writing skills, the ability to write reports was stressed in 7.46 percent of the advertisements. Table 1.0 shows that nearly half of the employers considered good written and spoken communication skills necessary for employment.

Table I

Skill Requirements (other than technical skills) Specified in Job Advertisements

S. No.	Skills	Frequency
1	Team Player	12
2	Good communication skills	15
3	Good interpersonal skills	04
4	Fluent written and spoken English	16
5	Leadership skills	05
6	Presentation skills	02
7	Problem solving ability	03
8	Analytical skills	05
9	Ability to write reports	05

Interviews of the TPOs from various engineering colleges helped to understand the recruitment process and also understand the criteria that companies look for in the students. The responses from TPOs highlight the following skills to be important during selection:

1. Communication skills and the ability to learn new things and logical thinking are considered more important than technical knowledge.
2. The core companies generally tend to place technical skills above communication skills in the placement process, while the software companies look for good communication skills and then technical skills.
4. The ability to work in teams is an important criterion for both kinds of companies.

Discussions with the Technical Subject Teachers and students once again reaffirmed the importance of good communication skills for engineering graduates. They contended that the industry gave priority to communication skills. If the students were found to be technically sound, the one factor that got them selected were their communication skills. Thus, it can be concluded that good communication skills are indispensable attributes of the twenty first century Indian engineer.

B. Language ‘necessities’ of the Workplace

Language ‘necessities’ of the workplace were assessed based on the information gathered by administering questionnaires to 30 RTMNU engineering graduates working in different companies. Information was also gathered from studies on workplace language skills carried out in India and outside.

It is clear that English cannot be avoided (Table II) at the engineering workplace as cent percent of the respondents affirm that there is a wide use of English at their workplaces. The use of English in different work related contexts was ascertained by asking the respondents how often (Never/ sometimes/ often/ very often) they used English in different contexts. The information from

work related contexts showed nearly equal percentage (around 76.70%) use across all the four macro skills of English.

Table II
Use of English in Work Related Contexts (Skill-wise Frequency)

S. No.	Contexts	Never Sometimes	or	Often or Very Often
1	Writing	34.10		76.50
2	Reading	23.30		76.20
3	Listening and speaking	18.70		77.40

(Figures indicate percentage)

C. Language ‘Necessities’ of Academics

The academic language necessities of students were collected through discussions with subject teachers, the students, and the observations of the researcher. The dissemination of technical education in RTMNU takes place through English.

Table III
Students’ Views Regarding the use of English for Academic Purposes

S. No.	Tasks	Very Important	Important	Somewhat Important	Not Important
1	Understanding lectures and taking notes.	31.90	42.10	18.30	05.50
2	Asking questions/seeking clarifications.	33.60	41.70	17.70	05.70
3	Reading books on technical subjects.	44.90	34.20	16.60	03.10
4	Writing assignments.	58.80	38.20	02.40	01.10

The study shows (Table III) that the students’ most important use of English for academic purposes was for writing assignments (97% - combining the two categories ‘very important’ and ‘important’). A high percentage (79.1%) opines that the most important use of English is to read books on technical subjects. Next in importance appears to be the use of English (75.3%) for asking questions and to understand lectures and taking notes (76%).

English is the medium of all engineering knowledge, and the prescribed and reference books. Additionally, the national scientific journals of many countries like India of the outer circle (as referred to by Kachru (1991), are increasingly being published in English. This has resulted in more and more information being available in English. Hence engineering students have to use English to gain knowledge and carry out research activities, complete assignments, project work and to participate in seminars.

D. Language ‘Lacks’ of Students

The gap in proficiency between the target and present proficiency is referred to as the learners' 'lacks'. Language 'lacks' were assessed through a Communicative Language Ability test of the students, the students' opinion of own proficiency and the English Teachers' view of the students' English proficiency. The teachers were asked to give their assessment of the students' relative proficiency in the four language skills of Listening, Speaking, Reading and Writing. According to the teachers, speaking skills are the least developed.

A group of 14 students from a private engineering college were administered a test to gather a broad-brush picture of the communicative language ability of RTMNU engineering students. This was done through a written test an interactive task and an interview. Though the major areas of weakness were seen to be vocabulary and oral communication, written communication also needed attention. Only 14.28 percent of the student sample showed adequate communicative language ability to cope with academic, employment and work related language needs.

E. Language 'Wants' of Students

Language 'wants' were assessed through different close ended questions in the questionnaire and by inviting their suggestions. Majority of the students (60.80 %) voiced the need for a practical language use approach to language learning expressed the need to include Group Discussion practice, development of soft skills, especially communication skills. The students were of the opinion that though they were able to understand most of the technical content if taught through English, 64 percent students felt the need to enroll in a course to improve their proficiency in English. This showed their dissatisfaction with their own proficiency in English and the inability of the present curriculum in providing what they wanted.

Different Aspects of the English Curriculum and the Language Needs of Students

The engineering English curriculum was analysed by studying its different parts like the time assigned, content, objectives, materials, the teaching learning processes, and assessment.

1. Time Allotted for English Classes

Language instruction is provided only in two semesters during the entire engineering course, a communication skills module in the first semester and a functional English module in the sixth semester. Both these syllabi put together allocates roughly 48 hours of language instruction. For most learners what the college offers is the only experience of language they have. The limited time at the disposal of the teacher inevitably involves a selection from the totality that could be provided. Mastering language skills within a span of one year and that too with so few contact hours is not realistic. The need for additional contact hours and continuation of language classes in the rest of the semesters is borne out by the responses received from all the stakeholders.

2. The Objectives and Contents of the Syllabus

Learning outcomes are not clearly stated. This is important as both teachers and the students should know the knowledge and skills that the students need to gain by the end of the course. The

syllabus misses out an important follow up to the theory given in the book i.e. practice, without which all the other efforts for communication skills development comes to naught and yet this potential source has not been tapped. Unless students use English in day-to-day activities of the college, they would not develop communication skills. It is obvious from the data collected that the syllabus focuses mostly on writing skills as students exercise these skills most (80%) of the time. Notwithstanding this, the students have failed to develop adequate proficiency in writing as can be seen from an examination of their writing.

It was observed that report writing was taught by asking students to copy a given model. The result is that students do not understand the how and why of the formation of a text and go through the steps of writing without any cognitive involvement. This contributes to underdeveloped written communication skills.

Teaching and testing of speaking skills is not a part of the existing syllabus. Speaking is the most neglected skill, with the students getting opportunities to practice only 10 percent of the total teaching time. The engineering students opine that when it comes to language skills required at the workplace, the syllabus has least focused on developing communication skills (oral and written) needed at the workplace (20%). Only 31.2% students feel that the English course has helped them gain confidence in oral communication. The contents do not fulfill the needs expressed by a majority of students (41.9%) to include GD practice, development of soft skills, especially communication skills. The existing syllabus cannot develop the capacity to communicate as the focus of the syllabus is only on communicative knowledge.

3. Approach to Teaching

English is mostly taught like the other subjects, with a focus on information about language rather than language use. Over reliance on the traditional approaches/formal syllabus can only lead to a situation “where language is taught and practised but not carried over into spontaneous production.” (Swan 396, 2005). Nearly 60 percent of the students (195 suggestions) voiced the need for a practical language use approach to language learning. English is taught much the same way as any other academic subject. The lecture method is the most practical method to be used in large classes, but the flip side is that it leaves little scope for interaction between teachers and students.

4. Focus on the Learner

The English curriculum is introduced and planned on what curriculum planners consider as best for students. The syllabus is not based on needs analysis. Only 10% of the teachers invited the students’ suggestions regarding changes in the course content to fulfill their language needs. Hence it can be inferred that student-centric practices are not a common feature of the engineering English classes.

5. Assessment

Language teaching and assessment do not encourage effective language use. The university examinations tests writing skills and communication skills. The students' ability to write answers independently is not assessed because of the predictive nature of questions asked in the university examinations.

Conclusions

The education system needs to respond and adapt quickly to changing demands of the industry for education to be relevant to the students. English being the medium of instruction in engineering and technology courses, the students' language proficiency affects not only engineering studies and research but also their employment in a globalised work environment. This calls for a probe into the ways in which students can be better equipped with language skills.

The relevance of the English/ Communication skills course depends on the extent to which it prepares the students for their workplace. If pedagogical tasks prepare students for workplace tasks, students' motivation in the completing the course would increase. Hence it is imperative to understand discourse activities of the Indian engineering workplaces.

The engineering English course should be a more specific course catering to the academic and professional needs of engineering students to be relevant. In effect, it needs to be more learner and learning centered.

Improved communication skills being the necessity, lack, and want of the engineering students, can be developed through communicative activities which would provide more language use opportunities. Students need to be involved in interactive teaching practices across the engineering curriculum to strengthen their communication skills. The present system of laying more stress on writing results in a lop-sided development of language proficiency.

There is a compelling need to define the objectives of teaching English and choose appropriate teaching and assessment methods for the course. Suitable learning objectives and outcomes need to be identified that would meet the language needs of the students. Despite the changes that have recently occurred in the syllabus, learners are still seldom consulted or heard. Moreover, a syllabus which is not based on needs analysis will result in pedagogical failure as it does not consider who we teach, how we teach and what to teach.

References

P'Ryan, A. 2011. Engineering English: A Critical Evaluation. Language in India. Nov.2011<www.languageinindia.com/nov2011/ryandissertation.html>. Rtdv 2 Jan.2015

Kachru, B. 1991. World Englishes and Applied Linguistics. Language and Standards: Issues, Attitudes and Case Studies, M.L. Tickoo Ed.), Singapore: SEAMEO Regional Language Centre. pp 178-205.

Raghupathi, H. 2008. Curious Case of India's Unemployable Engineers. Educationworldonline. 2008. [www.educationworldonline.net /index.../page-article-choice-more-id-1257](http://www.educationworldonline.net/index.../page-article-choice-more-id-1257)> Rtd. 4 June 2011

Swan, M.2005. Legislation by Hypothesis: The Case of Task-based Instruction. Applied Linguistics, vol.26 (3). pp 376-40.

Savignon, S.J. 2002. Interpreting Communicative Teaching: Contexts and Concerns in Teacher Education. Yale University Press. <http://www.jstor.org/stable/j.ctt1npshg>. Rtd. 5 Sept.2015.

T. Hutchinson, & A. Waters. 1987. English for Specific Purposes, Cambridge: Cambridge University Press, 1987.

Paradowski, M. B. 2002. Needs Analysis As The First Step In Syllabus Design. *The Teacher. Vol 1: 28*.<https://files.eric.ed.gov/fulltext/ED503443.pdf>. Rtd. 12 August 2020.

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