English For Science And Technology: A Learner Centered Approach

Prof. V. Chandra Sekhar Rao
Professor in English, Department of Humanities and Sciences
Joginpally B R Engineering College (Affiliated to (JNTUH),
Hyderabad-500075, Andhra Pradesh, India
Email:csrao46@gmail.com, Website: www.jbrec.edu.in

Abstract

This paper deals with the importance of Communicative Language Learning and the learner-centered environment to the engineering students. In the present scenario of industry English communication skills are given very much importance. Learner-centered education focuses on each student's individual needs. English Language Communication Skills like LSRW are vital for the engineering students to meet the needs and demands of technical advancement in education and employability. EST is a sub category of the larger field of English for Specific Purposes (ESP). It has been very important for the institutions of engineering and technology. Effective language teaching and learning can only be achieved when teachers are aware of their learners' needs, capabilities, potentials, and preferences in meeting these needs. The teachers of English in engineering colleges ought to acquire a specific set of competencies and get trained in latest Teaching-Learning Strategies. A learner-centered approach facilitates learning through techniques involving learners. Students are provided an opportunity to put grammar to use and to relate grammar instruction to real life situations. Technical vocabulary ought to be taught in order that learners may be trained to use words with appropriateness and precision for more effective communication.

Key words: Needs of Engineering Students, Learner-Centered Approach, Needs Analysis, Technical vocabulary, CLT Approach, EST, EAP, ESP, and LCE.

1. INTRODUCTION

Generally speaking, English is regarded as the lingua franca of international business, economy, science & technology. It is overwhelmingly dominant in scientific and technological communication with all relevant and ground-breaking information. English has constantly evolved as the main means of communication in the engineering field and finally gained a huge advantage over other languages.

The key to improving students' English speaking skills is to provide a favourable communicative environment to stimulate their desire for interacting in the target language, and to create multiple opportunities for students to practice. In the traditional teaching approach, however, much emphasis were put on explaining linguistic facts, and few interactive activities were organized, resulting in inadequate training of students' speaking competence.

It has been written aiming at examining the impact of learner-centered teaching and learning process on the engineering students' performance, attitudes, and retention in English for Science

and Technology. Learner-centered education focuses on each student's individual needs. The purpose of the learner-centered model is to provide an individualized, flexible learning environment for every student.

Learner Centered Education or LCE is the type of classroom setting wherein the learners are persuaded to submerge themselves in their own learning development. That is, to encourage learners to actively use the target language while engaging in small-group work .Furthermore, the teachers' roles here are to motivate learners and to raise their levels of interest in the English language.

2. OBJECTIVES OF THE STUDY

- To encourage the engineering students to involve actively in their own learning processes
- To strengthen and promote the integrated language skills and abilities of students
- To stimulate their interest and cultivate their critical thinking
- To provide them opportunities to talk by using pair work or group work
- To develop their autonomy and interaction in order to succeed in their employability and to meet workplace needs

3. RATIONALE

The author of the present study had the personal experience belonging to colleges of Engineering and Technology as a faculty of English for science and Technology for over a period of 20 years. Then he did research for his Ph D thesis titled, **"An Analytical Study of Teaching/Learning to develop Linguistic and Communicative Competence of Engineering Students"**. During the period, he had a remarkable experience of surveying and teaching English communication skills to students of under graduate progrmmes at various engineering institutions.

Having taught thousands of students of engineering and technology, the author would like to find out some innovative methods and strategies for teaching / learning English for science and Technology.

The data collected for his research purpose and his personal experience of surveying resulted in growing realization that the students, by and large, lack the ability to express themselves in simple, lucid English. This led him to the present study.

4. THE NEED OF LEARNER-CENTERED TEACHING

In the present competitive world, students should be provided individual learning atmosphere to get communication skills for their survival and employability. Learner-centered teaching method is an important strategy adopted by second language teaching researchers and teachers, which encourages the student to make plans and choose what to learn according to their own interest. In this way, individual ability can be well motivated. It is no doubt that globalization brings new requirement and challenge on education, and the inter-disciplinary talents of high quality are needed to meet the need of world market.

5. REVIEW OF LITERATURE

During 1970s-1980s the impact of learner-centeredness in language teaching was evident with the development of communicative approaches which shifted the attention of the teaching-

learning processes from language form to language function, or to language use in accordance with the needs of learners (Savignon, 1997). This change in the approach to language teaching from traditional teacher-centred to more learnercentred (e.g. Nunan, 1988; Tudor, 1996), which as Nunan (1988: 179) noted, is "an offspring of communicative language learning" requires learners to participate and negotiate actively in meaningful interaction in order to interpret and construct meaning by themselves (Breen & Candlin, 1980).

Gibbs (1992) offers a useful definition of learner-centred learning. He states that learner-centred learning gives learners greater autonomy and control over choice of subject matter, learning methods and pace of study. The learner-centred education is the perspective that couples a focus on individual learner's heredity, experiences, perspectives, background, talents, interests, capabilities and needs. It also focuses on the best available knowledge about learning and how it occurs and teaching process that are effective in promoting learner motivation of highest degree.

Dudley-Evans and St. John (1998) provide a more comprehensive characterization of ESP (**English for Specific Purposes**) as language teaching designed to meet the specific needs of the learners through employing effective teaching methodologies and teaching activities.

Definition of ESP (Dudley-Evans, 1997):

Absolute Characteristics

- ESP is defined to meet specific needs of the learners.
- ESP makes use of underlying methodology and activities of the discipline it serves.
- ESP is centered on the language appropriate to these activities in terms of grammar, lexis, register, study skills, discourse and genre.

Variable Characteristics

- ESP may be related to or designed for specific disciplines.
- ESP may use, in specific teaching situations, a different methodology from that of General English.
- ESP is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. It could, however, be for learners at secondary school level.
- ESP is generally designed for intermediate or advanced students.
- Most ESP courses assume some basic knowledge of the language systems.

English for science and technology or EST is a sub category of the larger field of English for Specific Purposes in which it shares some basic characteristics with the larger field of ESP. It emphasizes purposeful and utilitarian learning of English. The communicative needs of the learners are important consideration of course design.

EST is concerned with both the oral and written discourse of English for academic or professional, occupational or vocational purposes. It mainly deals with learners at the tertiary

level for whom the learning of English takes on a service role for their specific needs in study, work or research.

6. LEARNER-CENTREDNESS AS AN APPROACH TO TEACHING

Piccinin (1997) makes a mention of three approaches to learning: content-centred, teacher-centred and learner-centred. While the first two approaches put content to be taught and teacher's authority at the focus, learner-centred learning moves away from them and concentrates on learner motivation towards learning. The teaching involves getting to know the learners, founding out what they know their misunderstandings and creating a context of learning which encourages learners to actively engage with the subject matter intervening with the objective of changing them. Learner needs more structure at the beginning of a course and will develop habit of independent learning later on. This type of learning involves more than mastering the content, designing sound learning experiences, knowing instructional techniques.

According to Nunan (2004a, p.8), "a learner-centred" classroom is one in which students were actively involved in their own learning processes. This involvement has two dimensions: first, students take charge of their own learning processes, including making decisions, plans and so forth; the other is to maximise the classroom time for students' interactive activities.

7. METHODS

In this study the research methods of data collection employed using both qualitative and quantitative approaches and the research findings are discussed with the descriptive data collected from the Questionnaires, Interviews and Classroom Observations. The questionnaire data were gathered from 180 participants (120 B.Tech students, 30 teachers of EST and 20 teachers of technical subjects) belonged to different Engineering Colleges affiliated to JNTU, Hyderabad.

8. FINDINGS

8.1.Needs Analysis Questionnaire to Students reveals that students of engineering and technology have recognized English:

- As skill-oriented one and given importance to its basic language skills and sub-skills and their priority such as: 1.Listening 2.Speaking, 3.professional Speaking, 4. Grammar, 5. Reading, and 6. Professional Writing.
- The teachers of English in Engineering Colleges need a special set of competencies than those of the General English teachers.
- The EST Teachers to be facilitators, knowing the strategies of modern class room teaching and providing a lot of activities in the classroom and making them active participants.
- Phonetics should be taught for correct pronunciation, equipping with latest technology and multi-media software.

8.2.Technical Faculty Questionnaire indicates that:

- 90% of the engineering students feel comfortable to listen to technical subject taught in English, but 85% of the students are not good enough to use English for preparing a technical discussion, asking or answering questions.
- Most of the students do not have knowledge of special grammar items used in EST like nominal compounds, impersonal passives, conditional structures etc.
- They need scientific reading and learning of scientific vocabulary.
- English learning atmosphere should be created for the students to practice the language skills.

8.3.Faculty (English) Questionnaire shows as 90 % to 100 % of the EST teachers agreed that the teachers of English in engineering colleges ought to get trained and acquired a special set of Competencies / Skills, such as:

- **General Competencies of the teacher of English for science and technology** (teaching the correct use of linguistic features, ability to design the curriculum, using the communicative learner-centered approach, ability to use language laboratory, etc.)

- **Subject-Specific Competencies:**
  - ✓ **Listening Skills** (Listening and taking notes, Listening to short and long conversations, identifying the topic of the lecture, etc.)
  - ✓ **Speaking Skills** (task-based activities- describing /explaining /defining /classifying objects, etc.)
  - ✓ **Reading Skills** (Scientific and technical texts, Skimming for main ideas, Scanning for specifics, Predicting, inferring and guessing the meaning, etc.)
  - ✓ **Writing Skills** (definitions of technical terms, narration, description, enumeration, process, comparison and contrast, cause and effect, argument, etc.)
  - ✓ **Professional Speaking Skills** (professional presentation skills, mock interviews, group discussions, seminars)
  - ✓ **Professional Writing Skills** (Business letters, Technical reports, project reports, proposals)
  - ✓ **Special Grammar Items in Scientific and Technical Communication** (Use of modal auxiliaries in technical English, Conditional sentence, connectives in technical communication)

8.4.EST Teachers Class Observation

In classroom Observation, most of the EST Teachers in Engineering colleges have not been competent or skilled at teaching. They do not follow the modern methods or techniques of teaching and the EST class is completely teacher-centered.

9. IMPLICATIONS AND RECOMMENDED STRATEGIES

Regarding **Needs Analysis Questionnaire to Students** English Language Communication Skills like LSRW should be given so much importance in order to meet the needs and demands of technical advancement in education and employability.

More specifically, such an ESP (English for Specific Purposes) programs or courses could assist the engineering students perform the work-related communication tasks around: 1) conversation skills (listening and speaking skills to be more specific), 2) reading skills, and 3) writing skills. The reading and the writing tasks of the engineers' work requirements could fall into one of the four categories: informational, visual/figure, report and procedural tasks.

Considering the data of **Technical Faculty Questionnaire** and the views of the teachers of science and technology, the engineering graduates should be provided and created advanced English learning environment such as understanding technical vocabulary, describing technical functions and applications, explaining how technology works, emphasizing technical advantages. In this regard technical faculty should also add their proportionate contribution for the students acquire good technical education and bright career with motivational attitude.

Having studied the responses of **Faculty (English) Questionnaire** and the student needs, Effective language teaching and learning can only be achieved when teachers are aware of their learners' needs, capabilities, potentials, and preferences in meeting these needs. The teachers of English in engineering colleges ought to acquire a special set of competencies and get trained in latest Teaching-Learning Strategies such as:

9.1.English for Academic Purposes

EAP and EOP, both are branches of ESP. Students are exposed to the expectations and requirements of their faculty particularly to the target language situation. The EAP courses are suggested for EST teachers in the engineering colleges to accomplish classroom based activities such as: oral presentation skills, understanding lectures, note-taking and note-making skills, academic writing, academic reading and vocabulary, and academic speech and pronunciation.

9.2.Communicative Language Teaching / Learning: A Learner Centered Approach

CLT approach plays a vital role in enhancing the learners' communication skills. A learner-centered approach facilitates learning through techniques involving learners either in pairs or in groups. It is suggested that the EST teachers should consider CLT approach to let the learners have clear knowledge of the linguistic, phonological, cultural, and functional, interactional, grammatical, lexical, socio-linguistic and social-cultural competence to attain 'communicative competence' in English.

9.3.Grammatical Competence

Most of the principles of teaching grammar are derived from the CLT methodologies. Grammar should be taught for communication in context and in relation to language skills. The EST teachers are advised, during grammar instruction, to provide meaningful input through context and provide an opportunity to put grammar to use, and relate grammar instruction to real life situations. This is best achieved if grammar instruction is treated in the same way as the teaching of the four skills which involves smooth and organized transitions.

9.4.Lexical Competence: Technical Vocabulary

Nowadays it is widely accepted that vocabulary teaching should be part of the syllabus, and taught in a well-planned and regular basis. Every field of science and technology has its own list of terms and phrases. Technical vocabulary ought to be taught in order that learners may be trained to use words with appropriateness and precision for more effective communication.

9.5.Strategies for Learning Technical Words

Words which are based on Greek or Latin roots should be analyzed for possible meanings. Therefore, the EST Teachers should:

- Facilitate learners to gain the more general skills of recognizing technical words, interpreting definitions, relating senses to a core meaning, and learning word parts.

- Provide learners with the tools for dealing with technical words. In this way teachers need not get involved in trying to teach in a technical area, but can direct their attention to vocabulary strategies.

- Be responsible for teaching students technical papers and materials for reading and writing in English courses which will be more technical and sophisticated.

9.6.The teacher's role in a learner-centered classroom of EST:

The teacher's role in a learner-centered classroom of EST is absolutely critical. It takes practice. It takes patience. It requires a willingness to try new things, fail, reflect, revise, redeem and repeat. The teacher has to use many techniques in the teaching process. The teacher in a learner-centered classroom of EST has to:

- Introduce challenging, engaging ideas that inspire student questions.
- Find a happy medium between giving students too much direction and too little.
- Establish routines and structures in the classroom that support inquiry.
- Engage in frequent conversations with students.
- Focus students on generating arguments based on evidence.
- Provide opportunities for students to choose how they demonstrate their learning.
- Connect students with experts in fields relevant to their inquiry and facilitate their conversations.
- Teach skills and processes that students need to know in order to engage in effective inquiry.
- Provide time for reflection and meta-cognition within the structure of learning cycles.
- Maintain the students to have their mood and mind happily and hilariously all the time.

9.7. Learner-Centred Activities

Course of activities would be designed for learner-centred teaching in the class with a view of making students comfortable with different strategies in English language teaching and learning process. The activities have to be focused primarily on the skills of listening, speaking, reading, writing, grammar and vocabulary.

Activities of listening and speaking: Simulation, role-play, seminars and group discussions on the topics of technology and science are mainly suggested for activities of listening and speaking skills. On the other hand, mock interviews and speeches/presentations are also recommended.

Activities of reading and writing: Different Types of reading-comprehension exercises of science and technical texts are primarily recommended specifically on scanning, skimming, extensive reading, intensive reading, etc.

Activities of grammar and vocabulary: While practicing reading and writing activities students should be asked to identify tenses, sentence structures, adjectives of description, use of modal auxiliaries, conditional sentences, and connectives in technical texts. And they ought be guided to find out new and technical vocabulary and to know the meanings and usage of the vocabulary.

10. CONCLUSION

In conclusion, Learner Centered Approach provides individual learning atmosphere to the students in their learning process. This study is fundamentally useful for EST teachers as English Language Teaching in Engineering colleges dealing with the competency requirements of the English teachers. The findings of the study provide useful and practical information to the Technical Institutions to improve the competencies/skills of the English teachers so that the students of engineering and technology get benefited in accomplishing their language needs.

References

Anu Baisel, Exploring Learner Centered Approaches towards English, Department of English,Vels University,Velan Nager, Pallavaram,Chennai-117

Ashraf, M. R. (2009). Effective Technical Communication: Tata McGraw-Hill Publishing Company Limited, New Delhi.

Block, D. & Cameron, D. (Eds.). (2002). *Globalization and language teaching*. London and New York: Routledge.

Bollag, B. (2000). The new Latin: English dominates in academe. *The Chronicle of Higher Education, 47*(2), A73-A76.

Cambridge Dictionaries Online. http://dictionary.cambridge.org/

C. S. Rao (2011), Ph D thesis on An Analytical Study of Teaching/Learning to develop Linguistic and Communicative Competence of Engineering Students, Dravidian University, Kuppam

CIEFL. (2006). Methods of teaching English: Skills in Language Learning and Use,

Block-III, PGCTE Course, Central Institute of English and Foreign Languages, Hyderabad.

CIEFL. (2006). Methods of teaching English: developing integrated skills and the elements of language, Block-IV, PGCTE Course, Central Institute of English and Foreign Languages, Hyderabad.

Dlaska, A. (1999). Suggestions for a subject specific approach in teaching foreign languages for engineering and science students. *System* 27, 401-417.

Dudley-Evans, T. & St. John, M. J. (1998). *Developments in ESP-a multi-disciplinary approach*. Cambridge: Cambridge University Press.

Hutchinson, T. & Waters, A. (1987). *English for specific purposes*. Cambridge: Cambridge University Press.

Jawhar, M. (2002). *Education for the K-economy: Challenges and response*. Retrieved June 10, 2008 from :http://www.sedar.org.my/articlePrint.cfm?id=16

Kenneth, C.(2004). Rethinking an engineer's education. *Electronic Engineering Times, 1315*, 59.

Learner-Centeredness In Teaching English As A Foreign Language *Teachers' Voices,* Kittiporn Nonkukhetkhong, Udonthani Rajabhat University and University of Queensland

Little wood, W. (1981). Communicative Language Teaching: An Introduction, Cambridge: Cambridge Univ. Press.

NASSCOM: Need for soft skills in Global Engineering Services. January 23, 2011

Nunan, D. (1988). *The learner-centred curriculum*. Glasgow: Cambridge University Press.

Priya Sasidharan, A Needs-Based Approach to Teaching and Learning of English for Engineering Purposes, National Institute of Technology, Rourkela.

Richards, J. & Rodgers, T. (2001). *Approaches and methods in language teaching: a description and analysis*. Cambridge: Cambridge University Press.

Sageev, P. and Romanowski, C. J. (2001). A message from recent engineering graduates in the workplace: Results of a survey on Technical Communication skills, *Journal of Engineering Education*, October, 685-693.

Venkatraman, G. & Prema, P. (2009).Developing a Set of Competencies for Teachers of English in Engineering Colleges, source:http://www.esp-world.info/index.html.

Address

Prof. V. Chandra Sekhar Rao
Professor in English, Department of Humanities and Sciences
Joginpally B R Engineering College (Affiliated to (JNTUH),
Hyderabad-500075, Andhra Pradesh, India
Email:csrao46@gmail.com, Website: www.jbrec.edu.in

Residence:

H.No. 3-5-140/12/1, Shivanagar Colony,
Hyderguda, Attapur, HYDERABAD-500048, A.P. , India
Mobile No.09603727368