RECOURSE TO CRITICAL THINKING AND PROBLEM SOLVING APPROACH FOR CIRCUMVENTING THE DIFFICULTIES ENCOUNTERED BY ESP TEACHERS IN THE GOMA ENGINEERING COLLEGES

JACQUES KAMBERE MUKULE*

Abstract

This paper discusses both the difficulties encountered by English language teachers and students in the Goma Engineering colleges and critical thinking and problem solving approach as a gateway to meet the needs of the targeted students, the expected content of the course and the way to teach it. With a view to preparing Engineering students for employment and mentally support them to participate in addressing the challenges of today's globally interconnected world, this research study argues that English language should be taught to Engineers as a practical skill rather than a subject as most language teachers do. The aim of the course is to equip engineers with communicative skills that will enable them to cope not only with professional realities at the labour market but also extend their chances to secure their position in the globalization process. This paper winds up with a series of recommendations towards the different partners of the teaching and learning process so as to reach long term and efficient language teaching aims.

***Key words**: critical thinking (CT), problem solving (PS), engineering and ESP teacher (English for specific purposes teacher)*

Résumé

Cet article traite à la fois des difficultés rencontrées par les enseignants d'Anglais et les étudiants au sein des Instituts Supérieurs d'Ingénieurs de Goma et propose l'approche de la pensée critique et de résolution de problèmes comme passerelle pour répondre aux besoins des étudiants Ingénieurs. Pour préparer les étudiants au monde professionnel et les aider mentalement à participer à la résolution des défis du monde d'aujourd'hui interconnecté à l'échelle mondiale, cette étude de recherche soutient que l'Anglais devrait être enseigné aux Ingénieurs comme une compétence pratique plutôt que comme une matière comme le font la plupart des enseignants de langues. Le but du cours est de doter les ingénieurs de compétences communicatives qui leur permettront de faire face non seulement aux réalités professionnelles sur le marché du travail, mais aussi d'accroître leurs chances de s'adapter à la technologie moderne et d'assurer leur place dans le processus de mondialisation. Cet article se termine par une série de

* Assistant de deuxième mandat à l'Institut Supérieur des Techniques Appliquées de Goma (ISTA-GOMA), Auditeur en Première Année de DEA en Didactique des disciplines, orientation Littérature Anglaise à l'École Doctorale de l'ISP/ BUKAVU. E-mail : mukulekam@gmail.com; tel :+243994221302.

recommandations aux différents partenaires du processus d'enseignement et d'apprentissage afin d'aboutir à des objectifs durables et efficaces de l'enseignement de la langue.

***Mots-clés** : La pensée critique, Résolution des problèmes, ingéniorat et Enseignement d'anglais pour les objectifs spécifiques.*

1. INTRODUCTION

No country across the world can pretend to ignore the role English plays in international matters. It is indeed, a linguistic tool by excellence that drives the global economy. It is, no doubt, the international language of diplomacy, business, science, medicine, engineering, tourism and the world music, and so on. So, the mastery of English is an asset for any ambitious and educated citizen of DRC.

It is, therefore, in conformity with this pressing need viz.updating the Congolese student so as to make him/her ready to take on the challenges of today's globally interconnected world, that the Minister of Higher Education of DRC in his ministerial order nº342/MINESU/CABMIN/MML/KOB/2011 of 23 rd/October/2011, has adopted English as the second language for higher education beside French both in public and private institutions. So, English has become, since then, a compulsory subject at all levels and fields of study in tertiary education. The aim is to provide the Congolese graduates with communication skills that will subsequently foster their participation in the globalization process, which is gradually turning the whole world into an 'interplanetary village'. This state of affairs has extended job opportunities to many English Department graduates who are now applying for jobs at the Higher Education level and once they are accepted they work as ESP teachers. However, even though they are recruited here and there in the Goma engineering colleges and universities, where they are supposed to teach English to engineering students, it has been revealed that most of them have encountered very serious difficulties in designing what to teach and how to teach it. This is mainly due to the fact that English department graduates at the Congolese colleges are primarily trained for teaching general English at high schools but not ESP courses at a higher level. Consequently, they are less primed to handle university students, particularly engineers, whose primary concern are wondering about robots, electric circuits, circuit diagrams, electrons, mechanical tools and therefore grant less importance on nouns, verbs, prepositions and tenses.

The ESP course that is taught nowadays at the college only covers 45 hours throughout the student's academic curriculum. It provides the student with some theoretical materials without furnishing practical skills regarding the teaching of ESP materials at a higher level. The insufficient pedagogical knowledge of ESP teaching coupled with the inappropriate choice of materials to meet the needs of engineering students, has awfully resulted in the students' lack of motivation for English, which is abusively considered to

be a discipline rather than a practical skill that would serve as keys to open the door of success in their career paths.

It is indeed, conspicuous that the aim for which English was adopted as a second language, beside French at higher education, is far from being reached. It is clear that students have very serious problems of communication skills and consequently are not able to cope with the labour market requirements which are very demanding and competitive as far as language is concerned. With regard to these worries, a number of questions have drawn our attention:

- Are the objectives for which English was adopted at higher education reached or not?
- Are English department graduates equipped with ESP pedagogy to manage ESP courses at the university level?
- What strategy should be applied to train communication skills to Engineering students?
- Do the teaching and the learning processes allow students to develop communication skills?
- Do the syllabus materials designed by teachers meet the students' needs?

Throughout this study, our focus attention will be put on analyzing the difficulties encountered by language teachers in engineering colleges and propose, among other approaches, the recourse to critical thinking and problem solving approach which, in our view, agrees with DAVID COTTON et al. (2013:86) that: *''engineers are talented people who find solutions to problems that are important to society. They are critical thinkers and problem solvers''*

The critical thinking and problem solving approach will hopefully play a significant role since it totally involves not only the students' needs in the material to learn but also gives room to their feedback concerning the material under study.

1.1. Objective of the research

This paper attempts to analyse the most frequent problems that are faced by ESP teachers in the selected Goma Engineering colleges and proposes an alternative way that enhances the recourse to critical thinking and problem solving approach in dealing with Engineering students.

2.2. Methodology of the research.

In collecting the data to reach the aim of this study, a number of methods, viz., sampling method, participant observation and interviews have enabled us to select the members to participate in the study and contribute as sources for primary data. In trying to secure

reliable data from our samples, we have attended a number of classes in different Goma engineering colleges with a view to grasping the difficulties encountered by both teachers and students in the process of teaching and learning English. The chart shown below provides an overview of our selected samples. To maintain confidentiality of the names of the participants, we have deliberately used initials of their names.

College/university	Initials of names of teachers	Teacher' qualification	Subject of the day	Date
IBTP-GOMA	MBG	Lecturer	Tools used in building	January 6th2018
UNIKIVU	GNR	Lecturer	Parts of a plant and their functions	Jan.15th 2018
IST-GOMA	KKB	Lecturer	Reading catalogues	Feb.20th 2019
ISIG-GOMA	SSF	Senior Lecturer	Internal and external parts of a computer	May 24th 2019

Throughout the class attendances and interviews carried out with teachers as well as students, it is observed that in many ESP classes, the teacher-centred approach is of great use. Consequently, engineering students are, by and large, not giving enough importance to English language and grant primary preference to their subjects. In such a context, teachers face a difficult task when many students are not wholly motivated to master English which is learnt as a subject but not as a tool that might help them to express their engineering knowledge.

1.3. Scope of the research.

Teaching technical English to engineers is not quite similar to teaching general English, but it is true that general English still can supplement the teaching of technical English. To contribute to the improvement of ESP teaching in engineering colleges, we have attempted to raise the most frequent difficulties that are faced by language teachers in technical colleges and have proposed critical thinking and problem solving approach as a gateway to overcome the issue of the demotivation of engineering students in the English class. Indeed, the research study provides the reader with a specimen of a technical lesson structure for engineering students.

2. DIFFICULTIES IN TEACHING AND LEARNING TECHNICAL ENGLISH.

Throughout the findings of this research paper, we have found out that the main challenges, to which the language teacher is exposed, are related to four important factors:

- Teacher himself/herself
- Teaching methodology
- Failure to meet the students' needs in the design of the teaching material
- Students themselves

The chart below discusses the trouble-making factors in teaching and learning process and how those issues can be addressed by the teacher.

challenges	**Proposed remedies to overcome the problems**
1. The teacher himself/herself	
Taking into account a certain number of facts, this paper has noted with dissatisfaction that the ESP teacher, despite his/her commitment and pedagogical aids at his/her disposal, is still exposed to any of the following deficiencies: ➢ At the college he/she is at 90% trained to teach general English at secondary school, but not at higher level. i.e not sufficiently equipped with the principles of ESP pedagogy.	Considering the pressing need of workforce in higher education, the English department should reform its curricula by including ESP pedagogy so as to equip the students with practical skills in teaching ESP classes.
➢ The language teacher is supposed to teach experts in in their fields of study. He/she often does not understand some technical terms fully. So, difficulties will arise in explaining some concepts related to the field of specialty. In other	Cooperation with subject specialist staff is of great importance to help the language teacher explain some concepts and show how the selected area of the course might be useful to the student whether in his professional life or in personal research in the field of engineering. Teaching technical English as a communicative skill, the

	words, the insufficient professional background of ESP teachers in engineering fields is often an underlying demotivating factor in teaching experts.	teacher should try to master the material to be taught prior to the teaching proper of the technical terms related to the topic at hand, even if this is very demanding and requires courage.

2. Methodology Engineering students are primarily concerned with acquiring practical skills viz. explain how devices or systems operate, diagnose problems and provide solutions, repair devices, mount or demount devices and present results. In front of such a pragmatic willing student, the use of teacher- centered method also referred to as 'traditional methods', which is commonly applied by the majority of teachers we have visited, seems to be inappropriate in engineering auditoriums. It is obvious that the teacher-centered approach nourishes in the student's mind the conception that ESP course is somehow a discipline like the others rather than a practical skill.	Recourse to critical thinking and problem solving approach (cfr the following point of this study). Create lectures that produce results i.e. lectures that give the opportunity to hear and use technical jargons related to the engineering field. For instance, a lecture that involves the steps of checking a spark plug of a motorbike. Power point presentations. i.e. a lecture with audiovisual equipment in the auditorium to allow the teacher manipulate information and images. Cooperative learning. It enhances the ability to express one's views and respond to others' opinions.

3. The design and size of the course The English language teaching load is not sufficient to cover too many materials throughout the academic year. The design and size of the course proves to be one of the underlying demotivating factors for the students for any of the following reasons: ➢ The inappropriate choice of the teaching material by the language teacher who fails to take into account the students' specific needs due to the fact that he/she does not possess prerequisites in the engineering field.	At this stage, a close and regular cooperation with the subject specialist staff is of great importance to analyse and identify the real needs of engineering students. Indeed, needs analysis may be carried out by submitting a questionnaire or conducting interviews with companies or engineers already employed in local industries in order to grasp the real English material needed by an engineer.
➢ Lack of contextualization of the technical jargons of Engineering. Most ESP lecturers tend to focus on engineering terminologies learnt in isolation and individually rather than creating activities that may cover technical jargons. i.e. Most language teachers call for students to memorise engineering related terminologies rather than focusing on their use in a practical activity. ➢ The length of the content of the syllabus not adjusted to the teaching load. When the language teacher's syllabus	Create communicative tasks that include engineering related terminologies rather than giving them in isolation. For instance, assign a task on how to install a socket, how to mix concrete by hand, steps of replacing a bulb in a socket etc.

contains more materials than the required load, the teacher is doomed to run after the covering of the content rather than putting more focused attention on the students' communication skills.	Shortly put, the programme modules used are not appropriate, and need to be discarded and replaced. The length of the content of the syllabus should be restricted to the specific objectives. Take into account the saying: ' **Do not swallow more than you can chew'.**

4. Students themselves Despite the teacher's commitment and availability of enormous materials and methods, the mastery of English communicative skills also depends more on the curiosity and readiness of the learners. It is obvious that the lack of motivation manifested by the learners renders the task difficult for the teacher. The lack of interest and hatred towards English developed by a significant number of students in engineering colleges seems to be pervasive due to either of the following causes: ➢ Lack in understanding practical utility of English at the labour market in a French speaking country like DRC. Engineering students have failed to realize that even though technical knowledge is an asset to find a job, it is through communication skills that technical knowledge may be expressed.	The language teacher's task is first and foremost to sensitize the students about the importance of communication skills both in personal life and in professional life. The teacher should create lectures which discuss the importance of English at the very beginning of the course using occasionally French where this is necessary.

➢ Low level of English language proficiency. Most students complete secondary school studies with very serious difficulties in English proficiency. The incapacity to use basic English impedes the acquisition of ESP course at the tertiary level. It is somehow naive to expect a student to cope with ESP classes when he/she hasn't mastered basic English. It is true that such a student will stay away from the ESP classes because the understanding of terminologies related to Engineering will fundamentally depend on the proficient background he/she possesses in the target language.	The language teacher should introduce ESP classes after he/she will have filled the student's gap in basic English. i.e. Avoid introducing ESP classes in the preparatory year or first year. Sensitize students to read intensively and extensively, watch English videos, listen to English music and news and practice the language in class.

3. OVERVIEW ON CRITICAL THINKING AND PROBLEM SOLVING APPROACH.

During the academic training, engineering students combine creativity and design with scientific analysis to evaluate, develop, test, modify, install, diagnose problems, discuss various issues, describe functions, explain how devices or systems operate and provide solutions. This implies that an engineer is required to be imaginative, responsible and creative in problem solving.

In the light of what an engineer does and the way he/she is trained, the ESP teacher's task in such a particular context, is complex and involves much commitment and devotion in terms of methodology selection, teaching techniques and procedures, pedagogical aids and time management.

Obviously, there is no consensus on what the best approach or method is in teaching and learning process. It is up to the individual teacher, in his/ her respective class, to adopt whatever approach he/she thinks appropriate to reach the assigned goal. If the assigned goal is reached successfully, then the approach will be said to be suitable. However, in view of what engineering is and what the society expects from engineers, this paper has attempted to propose ESP teachers in engineering colleges, among many other approaches, the recourse to critical thinking and problem solving approach.

3.1. Critical thinking and problem solving approach.

Critical thinking and problem solving has prevailed in modern education for a considerable time. It is, however, curious to find out that so far there is no consensus on how to define it. Different schools attempt to define it in their own ways.

John Dewey (1909: 10) defines ‘‘critical thinking’’ as ‘‘Active, persistent and careful consideration of a belief or supposed form of knowledge in the light of the grounds of which support it and the further conclusions to which it tends’’.

In the words of ALISON DOYLE (2019:13) critical thinking refers to the ability to analyze information objectively and make a reasoned judgment. It involves the evaluation of sources, such as data, facts, observable phenomena, and research findings.

MICHAEL TOMASZEWSKI (2019:6) also defines ‘‘critical thinking’’ as ‘‘the ability to think in an organized and rational manner in order to understand connections between ideas and/ or facts. It helps you decide what to believe in. In other words, it’s ‘‘thinking about thinking’’- identifying, analyzing, and then fixing flaws in the way we think’’.

The British Council (2016:2) defines ‘‘critical thinking’’ as ‘‘self-directed thinking that produces new and innovative ideas and solves problems. Reflecting critically on learning experiences and processes and making effective decisions by avoiding the common pitfalls, such as seeing one side of an issue, discounting new evidence that disconfirms your ideas, reasoning from passion rather than logic, failing to support statements with evidence, and so on’’.

Hank Kahney (1993: 13) defines ‘‘problem solving’’ as ‘‘whenever you have a goal which is blocked for any reason- lack of resources, lack of information, and so on- you have a problem. Whatever you do in order to achieve your goal is problem solving’’.

The definitions provided by the British council and Hank Kahney are particularly worth to mention in this study simply because they go along with the aim for which engineers are trained.

They are, as a matter of fact, talented people who find solutions that are important to society in order to achieve practical goals. This may include the construction of roads and highways, bridges, machines, tools and computers.

Therefore, this current study presumes that if an ESP teacher wants his /her students to become better critical thinkers and problem solvers, the recourse to critical thinking and problem solving approach will be an asset that leads to the goal. It is much easier to reach the goal if each respective ESP teacher in his/her class understands the need, the opportune moment and the way critical thinking and problem solving is done successfully.

With a view to implementing the critical thinking and problem solving approach in the Goma engineering auditoriums, this study has mainly been inspired from British Council's four important features or skills that are to be embodied in teaching:

3.1.1. Consider different objectives

In the introductory notions on CTPS approach, the ESP teacher will provide the students with explicit explanations of the term ''perspective''. What does it mean? What is its importance and how to consider different perspectives? It is indeed, one of the key features of critical thinking and problem solving which consists of looking at an issue by considering different sides. i.e. the individual does not focus on one side of the issue but navigates his /her mind on exploiting other multiple views and then think about what they feel like and how important they are. As a matter of fact, at this stage, the ESP teacher may, for example, through power point presentations, visualize images or information around which a series of good open questions will be formulated. Through the feedback secured from the students, different perspectives will be explored and therefore, at the end of the day, allow the students to always avoid restricting their views on one side of the issue. It is obvious that people do not perceive situations in the same way. Perception faculties vary from one individual to another. It implies that we should be tolerant and flexible to consider other people's views.

By training engineering students in considering different perspectives, the ESP teacher will be helping them not only to alleviate eventual conflicts and misunderstandings in class, but also arouse interest and collaboration of the learners in the ESP course. Moreover, training students in considering different perspectives will by and large improve the students' communication skills and specifically enhance the following values in teaching and the learning process:

- More language practice is reached without contempt, fear and shame
- Students develop and acquire self-confidence in their learning experience
- Students develop spontaneous ability to think critically throughout class discussions
- Harmony and social skills are promoted during and after the lecture
- Students acquire abilities to pay attention to other people's views and then express their own experiences or opinions freely and clearly.
- The luck of retention of the taught material is highly increased through discussions.

The ESP teacher, without inside knowledge in the engineering field, by applying the approach of considering different perspectives, will maximize his/ her role of standing as facilitator whose main task is to organize group activities, give clear instructions about when to start, what to do and how to do it. As he/she is in front of experts in the field, the use of this approach, in other terms, will significantly, on the one hand, alleviate the

attitude of contempt and hatred towards the course and on the other hand, enhance self-mastery on the teacher's hand.

It is highly recommended that by the end of the discussions, the ESP teacher should always remember to ask students how beneficial have been the perspectives of the others to their own. The answers from the students will serve as a tool to implement the culture of paying attention to other people's opinions in everyday life.

3.1.2. Assessing evidence

A.S. Hornby (2000:502) defines ''evidence'' as ''the facts, signs objects that make you believe that something is true''.

British Council (2016:24) also defines ''evidence'' as ''data on which one can base one's judgment or decision''.

From the definitions given above, we may infer that the failure of gathering and assessing evidence in any received information will likely lead to intuitive judgment or decision.

As said earlier, technical schools are largely committed to preparing their students to acquire practical skills that might enable them to cope with professional challenges and get wholly involved in problem solving in society. In reply to such requirement, the ESP teacher needs to create lessons through which students are trained in making and testing hypotheses on the basis of evidence rather than relying on human intuition.

As problem solvers in society, engineering students should be equipped with skills of assessing evidence for the following reasons:

- There is general tendency to consider that our pre-existing views are true;
- most of our views are based on feelings rather than facts;
- our customs and habits tend to prevail on facts in some specific situations;
- routine in problem solving understates the value of gathering and evaluating evidence;
- there is tendency to consider that people with higher ranks or superior to us are always right;

As critical thinkers and problem solvers in society, engineering students, in their language teaching and learning process, are to be trained in gathering and evaluating evidence mostly for the following reasons:

- It is the best way through which each individual learner gets feedback on whether his/her views are wrong or right;
- it is through such an activity that teachers are actually learning from their students some technical terminologies while gathering and assessing evidence;

- throughout discussions, an individual student gives the best of his /her knowledge for a common gain. In this way, the whole class combines their talents and skills to help one another and experience the joy of learning;
- it promotes cooperation, assistance, tolerance so as to reach the goal;
- it discourages teacher centered learning.

In the light of what precedes, the ESP teacher, in an auditorium of electrical engineers, may for example, propose a topic *(Lamp fails to blink or light or starts slowly).* The teacher, in his /her role of facilitator, will then ask the students to work in groups and each of the groups will try to make and test hypotheses, on the basis of evidence, about the reasons for which such a problem occurs to the lamp. At this stage, the teacher will allow the students to use occasionally French words where it is necessary for better understanding of the group members.

By the end of the group work, the students are called to present the results of their work and then it is up to the audience to approve or disapprove the group members' hypotheses through a feedback based on evidence.

3.1.3. Non –routine problems

Problems can be categorized into two types: routine and non-routine problems. Each of these problems is solved in its own way. i.e. the purpose and the strategies used for solving them are quite different.

In simpler words***, a routine problem*** is a type of problem for which there is an immediate solution. With the emergence and the development of modern technology, computers are being used to solve most of them. For instance, the number of students in a school can easily be recorded with a computer.

However, our main concern in this study is centered on *''non-routine problems''*. In the words of WOODWARD et al. (2012:44), non-routine problems and questions are ''those for which there is not a predictable, well-rehearsed approach or pathway explicitly suggested by the task, task instructions or a worked out example''. In other words, a non –routine problem is any complex problem that requires some degree of creativity or originality to solve it. It is solved in multiple ways.

In the light of the definitions given, we may assert that routine and non-routine problems make the lever of any scientific research. In other terms, where there is no problem, there is no research. It is through research that we gain knowledge and shape our society by explaining, predicting, innovating, controlling the observed phenomenon and understanding the exact nature of problems to find out solutions. Any research starts with a problem, concern or issue that later on turns into a question, which in turn, requires an answer.

The researcher, in his/her pressing need of finding out real facts, achieving new thoughts, evaluating information, testing hypotheses and inventing or designing new items, beyond the tools of research such as library tools, statistical tools and computer tools, must be able to raise non-routine problems and questions and find out solutions for the benefit of society or himself.

In this perspective, one of the ESP teacher's tasks, in the choice of the appropriate approach to apply, is first and foremost to consider the aim for which the learners are trained and the specific practical skills to acquire by the end of the lesson.

In agreement with DAVID COTTON et al. (2013:86) who argues that *engineers are critical thinkers and talented people who find solutions to problems that are important to society,* this paper proposes ESP teachers in engineering colleges to prioritize non- routine solving approach for the following reasons:

- It develops the student's mathematical reasoning power and promotes the understanding of the importance of mathematics in problem solving;
- it allows teachers to be aware of the students' basic needs through the different given ideas;
- it motivates and challenges students regarding the material under study;
- it gives chance to the students to practice some concepts related to the engineering field;
- it encourages the move from specific to general thinking. i.e. it encourages the ability to think in more abstract ways.

In fact, non –routine solving skills, through teaching and learning, may be implemented by the ESP teacher through different class activities such as:

- Asking non-routine questions on particular topics and allow the students to think aloud in pairs or groups. i.e. restrict in number and size questions that necessarily call for recognition. Allow through questions, your students to be creative and imaginative in problem solving. Example, *in the ten recent years, girls or women are getting more and more interested in engineering field here in the Goma colleges, what do you think would be the contribution of the interest of women in the process of problem solving in the ten years to come?*
- Create situations or instructions that involve non-routine solving skills with a view to practicing engineering related terminologies rather than giving them in isolation or in a list-form.

3.1.4. Looking for deep structure

According to the ‘‘Oxford Dictionary of English Grammar (2014) deep and surface structures are often used as terms in a simple binary opposition, with the deep structure

representing meaning and the surface structure being the actual sentence we see''. In other terms, deep structure refers to a *principle* that goes beyond specific examples while surface structure refers to particulars of an example meant to illustrate deep structure.

Jason Brownlee (2019:4) defines deep learning as ''a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called 'artificial neural networks'. In his article on 'Deep learning', he explains deep learning through a Russian doll analogy which claims that ''*deep learning sits inside of machine learning, which sits inside of artificial intelligence''.*

Throughout the definitions given above, if one may square the meaning with the field of teaching and learning, deep learning might mean *''a complete way of learning something that means you fully understand it and will not forget it''*. It is, in other terms, the kind of knowledge you take with you through the rest of your life. Such deep knowledge allows the beneficiary to go beyond the surface structure or a specific example and think effectively to understand problems or situations more deeply. In this way, we rightly side with the idea that students' prior knowledge and understanding is a great foundation on which to build deep learning. This existing reality justifies the necessity of brainstorming activities before the teacher undertakes a new material. It implies that deep learning takes roots on the foundations of our previous knowledge. i.e. It promotes *skills* than *knowledge*. The latter is the main focus of attention in the prevailing teacher-centred methodology.

Obviously, ESP teachers in engineering colleges, attempt to familiarize their students with facts, data and evidence to understand issues. However, there is still a crucial need to train students in such a way that the underlying principle (*deep structure*) is fully grasped so as to equip the students with skills to apply the principle more flexibly in multiple ways. In other words, the knowledge that is acquired by the learners, should not be stored in terms of surface structure, but in terms of deep structure so that it might be extended to different situations and in varied ways. As a matter of fact, an ESP teacher who restricts his/her lessons to teaching engineering related terminologies, should bear in mind that the learned terms might be used in many other contexts and fields of study. So, it is the task of the language teacher to encourage the learner use his/her brain in order to extend the context through which the learned terms might be applied. *This is deep learning*.

Each individual teacher has to find out the way deep structure learning can be applied in class. However, in agreement with the British council's advice, we approve that the best way for students to master critical thinking in general and look for deep structure in particular, is to practice it. And the best way to initiate the learners to practice, the ESP teacher has to prepare lessons that foster questions to be looked at from multiple ways. In other words, it is through questioning that the teacher will implement deep learning. So well-structured and precise questions offer great chance for both the teacher to change

his/her instruction to suit the needs of the student and the latter to increase the chance of understanding the topic under study.

The type of questions, in our view, does not count most if they may enable the individual teacher to guide his/her learners towards deep learning. Even so, in critical thinking and problem solving approach, we think that closed and open questions are appropriate because they are not only simple to understand and use but also offer profound insight into the learning levels of students.

4. SPECIMEN OF A LESSON STRUCTURE DESIGNED FOR ENGINEERING STUDENTS LEARNING OBJECTIVES:

Students will be able to:

- Read and understand the message conveyed in the text under study.
- Express through class discussions their views on the engineering field.
- List and distinguish the different fields of engineering basing on the text under study.
- Discuss the contribution of engineers to society according to the text and by referring to their own experiences.
- Distinguish between engineering and science

Level: 2nd year students of mechanical engineering.

Didactic material: Printed copies containing the text under study.

Lecture structure

Step1: the ESP teacher begins the lecture by announcing the topic under study. He/she asks different oral questions on the selected topic.

1. When you hear the word ‘‘engineer’’, do you think of someone who is a) male b) boring or c) dirty? Or all three?
2. What do engineers do? Do you know any? In which company does he/she work for?
3. What different types are there in engineering?
4. What has motivated you to join engineering studies?
5. Is engineering lucrative or a poorly paid profession?
6. Are there dangers in the engineering career? If so, could you mention any?
7. Should there be more women in engineering? Why? / why not?

Step2: the ESP teacher presents the instruction to the students.

1. Read and sort out three words that are new from text on engineering
2. After reading the text, the teacher divides the class into different groups. Each group includes 5 students.
3. Once the class is split into different groups, the teacher asks the group members to discuss the text in their own words to their partners and try to explain one another the possible new words
4. The teacher gives out some written questions about the material the students have read about. He/she also outlines the time assigned for the task. (*one hour at most)*

Written questions on the text

1. Choose the most suitable heading for each paragraph
   a) Engineers' contribution to society
   b) Origin and definition of engineer
   c) Women in engineering
   d) Engineering and science
   e) Types of engineer.
2. Match these inventions with the types of engineering materials mentioned in the text.
   1. Roads ⟶
   2. Aircraft ⟶
   3. A washing machine ⟶
   4. Microchips ⟶
   5. A heart pacemaker ⟶
3. What do engineers do? Do you know any? What different types are there?
4. What do you find most interesting about this text?
5. Why do you think there are fewer female engineers than male engineers?
6. Match the verbs from the text with the most appropriate words and phrases.

1. Test	a. safety tests
2. Build	b. a breakthrough
3. Solve	c. a problem
4. Make	d. a deadline
5. Do	e. a theory
6. Do	f. some research
7. Meet	g. a model/ prototype
8. Find	h. a solution.

7. In your respective group, list 10 great engineering achievements in your country. How have they improved people's lives?

Step3: The teacher may select one or two groups to present orally the result of the group cooperation.

Note: During the presentation, the teacher allows the audience to ask questions about the oral group work. Meanwhile, the teacher may explain some new words or highlight some points given by the groups.

Step4: The teacher concludes the class by thanking the different groups for their participation. He/she may also ask the students how the different opinions of the others have enriched their own.

CONCLUSION

In language teaching and learning process, communication skills are the primary concern of the language teacher. It is however, worrisome to notice from the investigation carried out, that communication skills in most of the Goma engineering colleges are taught as a subject but not as skills to equip students for life not for the success of exams.

Throughout the discussion, the paper has attempted to raise the most frequent difficulties encountered by English department graduates in handling ESP courses in the Goma engineering colleges.

Considering the fact that the problem is multifaceted and involves different factors, we have proposed an alternative that might meet the expectations of both the teacher and the students. This is the *critical thinking and problem solving approach*. The article winds up with a specimen of a lecture structure in an engineering auditorium and puts forward recommendations for long term and efficient solutions.

Recommendations

1. **To the English departments in DRC's colleges**
    - Equip English department graduates with practical skills in handling ESP courses at the tertiary level
    - Sensitize English departments students to read intensively and extensively.
    - Create technical English research cells that will consider all issues raised in the domain of teaching English for different career paths.
2. **To the ESP teacher**
    - Carry out students' needs analysis before and during the design of the ESP course
    - Cooperate with subject specialist staff in the design of the ESP course
    - Have a specialist dictionary to define technical vocabularies?
    - Handle computer tool especially power point publishers

- Apply a variety of teaching approaches among which critical thinking and problem solving approach.
- Avoid teaching ESP class as subject but consider it as a skill to be acquired.

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