

NEEDS ANALYSIS OF MECHANICAL ENGINEERING STUDENTS IN LEARNING ENGLISH FOR SPECIFIC PURPOSES

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ABSTRACT

This research aims to find out Mechanical Engineering students' needs and problems in learning English. This research is case study using qualitative approach. The research participants are 40 students of Mechanical Engineering in third semester, in the academic year of 2017/2018 and two English lecturers who teaching English in Mechanical Engineering Study Program. The instruments to collect the data are questionnaire, interview and documentation (students' achievement). The data are analyzed through triangulation technique i.e. data reduction, data display and conclusion drawing or verification. The research results show that English subject is important in Mechanical Engineering Study Program and the materials of listening, speaking, reading, writing, pronunciation, grammar, vocabularies on mechanical engineering and English application letter are extremely needed. Moreover, students' problems in learning English are students' lack confidence in mastering English both orally and in written, difficulties on learning pronunciation, grammar and vocabulary, and they do not get used to reading and writing English texts. Based on the findings, it can be concluded that analyzing students' needs and students' problems especially before designing ESP syllabus are very essential. It would be the basic information to decide the goals and objectives of learning.

Keywords: *English for Specific Purposes, Need Analysis*

Sari

Penelitian ini bertujuan untuk mencari tahu kebutuhan dan permasalahan mahasiswa dalam mempelajari bahasa Inggris. Penelitian ini adalah penelitian studi kasus menggunakan pendekatan kualitatif. Partisipan penelitian yaitu 40 mahasiswa program studi Teknik Mesin semester tiga, tahun akademik 2017/2018 dan dua orang dosen bahasa Inggris yang mengajar di program studi Teknik Mesin. Instrumen yang digunakan untuk mengumpulkan data yaitu angket, wawancara, dan dokumentasi (hasil tes pencapaian mahasiswa). Data dianalisis menggunakan teknik triangulasi; reduksi data, tampilan data dan kesimpulan atau verifikasi. Hasil penelitian menunjukkan mata kuliah bahasa Inggris penting di program studi Teknik Mesin dan material seperti mendengarkan, berbicara, membaca, menulis, pengucapan, tata bahasa, kosakata

tentang teknik mesin dan surat lamaran kerja berbahasa Inggris sangat dibutuhkan. Selanjutnya, permasalahan mahasiswa dalam mempelajari bahasa Inggris antara lain yaitu kurangnya rasa percaya diri mahasiswa dalam mempelajari bahasa Inggris baik secara lisan maupun tulis, kesulitan mahasiswa dalam mempelajari penguacapan, tata bahasa dan kosakata, serta mereka tidak terbiasa membaca dan menulis teks berbahasa Inggris. Berdasarkan hasil tersebut, dapat disimpulkan bahwa menganalisis kebutuhan dan permasalahan mahasiswa sebelum mendesain silabus bahasa Inggris untuk tujuan khusus sangatlah penting. Karena hal ini akan menjadi informasi dasar dalam menentukan tujuan umum dan khusus pembelajaran.

Kata kunci: *Bahasa Inggris untuk Tujuan Khusus, Analisis Kebutuhan*

Received 30 June 2018
September 2018

last revision 24 September 2018

published

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Introduction

English course at Universitas Pancasakti Tegal is one of the compulsory subjects for non-English Education students of the first year. In the Mechanical Engineering Study Program (S1), English course is given in the third semester and the needs of the students for English learning are of course different from those of other Study Program students. English Language Learning in Mechanical Engineering Program must be applicable specifically in Mechanical Engineering both orally and in writing. It is not solely aimed to communicate daily in general.

However, learning English that emphasizes only material that is specific in a particular field is not considered adequate to accommodate the needs of its learners. English Language Learning for Mechanical Engineering Study Program students must consider the needs of the students themselves so that they must use the specific purpose approach (English for Specific Purposes). According to Hutchinson and Waters (1987: 19), English for Specific Purposes is an approach to language learning based on the needs of its learners. Using this approach, the content and methods of learning are based on the learner's reasons for learning.

So far, the English learning process in the Mechanical Engineering Study Program is done by simply referring to giving materials that are specific in the field of Mechanical Engineering. But students as language learners are not directly involved to participate in

identifying the target situation, that is the situation where learners will use the language they are learning (Hutchinson and Waters, 1987: 12). In other words, the English course in the Mechanical Engineering Study Program does not have ESP goals that the students can use English adequately in the target situation.

In ESP, based on the target situation analysis then the syllabus can be designed. Hutchinson and Waters (1987) describe three models of the ESP course design approach that all begin with a target situation analysis. The English course syllabus in the Mechanical Engineering Study Program is based solely on lecturer's assumptions, knowledge, and experience related to English specification for Mechanical Engineering while the most important part of ESP starting point, that is situation analysis, is still ignored. Through needs analysis, information that directly influences the development of syllabi, materials, methodologies, and tests can be obtained to design an effective ESP course.

Based on the above description, the research on the needs analysis of Mechanical Engineering students in English learning needs to be done. The problems in this research can be formulated as follows:

1. What are the needs of students in English Course related to material aspects in Mechanical Engineering Study Program?
2. What are the problems faced by the students of Mechanical Engineering Study Program in learning English?

This study focuses on the needs of students in English course for Mechanical Engineering. In relation to these needs, the course materials which will be taught to the students emphasize the specific purposes or are considered as English for Specific Purposes.

Research on needs analysis conducted by Hossain (2013) on engineering students at Presidency University Dhaka used Learner-Centred Approach. The results of the study resulted findings on the level of learners' ability, appropriate learning models, varied learning material resources, time constraints, appropriate judgments, learners' desires

related to the content of the material, how the face-to-face process takes place (meetings in the classroom or online course), room facilities and learning time.

Hutchinson and Waters (1987) argue that the Learner-Centred Approach is difficult to realize because the principle of this approach is that total learning is determined by the learners. An English course organized by an institutionalized system, this kind of approach will be difficult to do because there are rules that indirectly affect the preparation of syllabus or material. So, they provide an alternative approach that is Learning-Centred Approach (learner-centred approach) assuming that the learner is just one of the factors that must be taken into account and learning is something that should be paid more attention. In Learning-Centred Approach, learning does not mean simply a mental process, but rather as a process of negotiation between individuals and society. The public determines the target of the situation, and the individual must do his best to achieve the goal as much as possible (or reject it). Learners can certainly determine their route and speed to reach targets but not make targets unimportant. This approach sees things beyond the competencies that allow one to be able to perform in the target situation, because the exploration is not the ability itself but how one acquires that ability. So in the context of ESP in English course at a university Study Program, the use of Learning-Centred Approach would be more appropriate because it focuses on maximizing learning.

Cowling's (2007) study conducted at Mitsubishi Heavy Industries (MHI) Japan to prepare an English intensive course shows that the results of need analysis are really useful in designing a syllabus that suits the needs of learners. Materials, manuals for teachers, and textbooks can be developed by focusing on the aspects that the learners desire. Needs analysis can also be used as a reference to place the learners on the right levels such as elementary, lower intermediate, and upper intermediate. The study suggests that the use of other parties—in addition to the targeted learners—to provide information will be useful to provide important recommendation for syllabus design.

Needs analysis, according to Hutchinson dan Waters (1987: 54), has to consider two different needs, namely target needs and learning needs. Target needs deal with what is necessary to do in the target situation. The target situation is divided into three, namely

necessities, lacks, and wants. Necessities are the kind of need that is determined by the demand of the target situation, i.e. what learners need to know in order to use the language effectively in the target situation. Lacks relate to what the learners already know, whereas wants are the learners' expectation of what they will learn. Thus, needs analysis should include desired knowledge, learners' knowledge, learners' subjective needs and how learning takes place.

Since need analysis has to be directed to decisions on what will be learnt in the course, Nation and Macalister (2010) categorize the questions based on four (4) learning purposes like language, ideas, skills, and texts. The questions can be used to make sure that need analysis elicits information for appropriate learning purposes.

In English Language Teaching, ESP is a branch of English as a Foreign Language (EFL). Therefore, the needs of language learning in ESP are particularly related to the non-native speakers (Robinson in Hossain, 2013). In addition, ESP is different from General English (GE). The difference is not on the existence of the need but due to the awareness of the need (Hutchinson and Waters, 1987:53). If the learners' needs are already identified, the awareness will influence the specific acceptable material and the material potential to be further explored. Consequently, the characteristics of ESP are likely shown by the material given (such as English for Medicine, Business, Tourism, Law, etc.), but it is actually a secondary consequent of a more principle thing after the learners' reasons of learning English are specified.

Based on the curriculum implemented in Mechanical Engineering Department of Engineering Faculty of UPS Tegal, students must take the English Course in semester 3. At this level, students are categorized as adult learners in which they have a more obvious learning orientation. Learning is to improve self-ability to develop its orientation. Therefore, the orientation is centered on their expected activities (Tisnowati Tamat in Sunhaji, 2013). Needs analysis used as a reference in the preparation of syllabus can accommodate the expectations of the students in learning English, so it will suit the learners' characteristics.

English learning in Mechanical Engineering Program of Faculty of Engineering of UPS Tegal is currently done based on the syllabus prepared by referring to English material for Mechanical Engineering but it has not involved students as subject of learning. So it is necessary to analyze the needs of students to study English in accordance with the students' expectations.

Methods

This research is a case study by using qualitative approach. This case study focuses on the students' needs analysis for learning English in Mechanical Engineering Study Program of Engineering Faculty of Universitas Pancasakti Tegal. The data were gained from third semester students and the English lecturers taught in Mechanical Engineering Study Program.

The subjects of this study are divided into two:

- a) The first subjects are 82 students of third semester in S1 Degree of Mechanical Engineering Study Program in the academic year of 2017/2018. However, due to the limited human resources and budget, the researchers only took 50% of the total students, that were 40 students as the sample.
- b) The second subjects are two English lecturers teaching in S1 Degree of Mechanical Engineering Study Program.

To gather the data, triangulation technique was used by using questionnaire, interview, and documentation (final English test result). The questionnaire was distributed to find out the students' needs in learning English. In addition, the interview was done to two lecturers in order to examine the needs of English Language Teaching. The documentation was in form of results of students' final exam. It was done to check the students' needs in learning English in Mechanical Engineering Study Program of Engineering Faculty of Universitas Pancasakti Tegal.

There were three instruments used; questionnaire, list of questions for interview, and English test (final examination). First instrument was questionnaire. It is in form of open-ended questions adapted from Diallo (2008) which was cited by Kadi,

Abdelouaheb (2013). It covers three (3) aspects of questions (necessities, lacks and wants). The three aspects were limited into the following categories:

- a) The importance of English course.
- b) Frequently used English skills (reading, writing, listening, and speaking).
- c) Current students' competences and weaknesses in learning English.
- d) Materials needed by students in learning English, especially English for Mechanical Engineering.

Second instrument was the list of questions for interview containing:

- a) the lecturers' background
- b) teaching method used by the lecturers
- c) explanation about students' learning motivation, and
- d) English syllabus used by the lecturers.

The third instrument was documentation which is in form of results of students' final examination contains materials that have been taught to students in one semester.

After the data were gained through questionnaire, interview and documentation, the next step was analyzing the data. The procedures of data analysis were as follows (Sugiyono, 2013: 247):

- a) Data reduction

In this step, the detailed data are reduced by selecting the essentials. Firstly, after the questionnaire distributed to students, the data are grouped into each criteria. The criteria were as follows:

- (1) English is important to learn.
- (2) English learning were in SMA/SMK was interesting.
- (3) Students' mastery in reading sub skill
- (4) Students' mastery in writing sub skill
- (5) Students' mastery in listening sub skill
- (6) Students' mastery in speaking sub skill
- (7) Level weaknesses of students' English competences

The percentages of each criterion were then calculated and put into tables in data display. Moreover, based on interview data, in this step the researchers analyzed the

data by taking note the results of interview referring to lecturers' education and teaching background, teaching method, students' motivation and English syllabus. The last data were gained from final English exam. It was compared to previous result before students got material (pre-test).

b) Data display

After the data were reduced into the essentials, the next step was data display in forms of brief elaboration, percentages, and tables.

c) Conclusion drawing/ verification

The last step is drawing conclusion and verification of the data gained. It answered the research problems referring to the students' needs and the students' problems in learning English.

Furthermore, the results and conclusions of this study will be used as a reference for Mechanical Engineering Study Program in designing English course syllabus.

Results and Discussion

1. Students' Needs in Learning English

Based on the questionnaire distributed to students, the results showed:

- (a) All of the respondents (4 students) answered that English is important to learn.
- (b) Twenty seven (27) students stated that English learning in SMA/SMK was interesting; while the rest, 13 students, said that English learning in SMA/SMK was not interesting.
- (c) For students' reading sub-skills, the data are as follows:

Table 1
Reading Sub-skills

Category	Always	Sometimes	Rarely	Never
Reading textbooks/course handouts	3	18	18	1
Reading technical articles in journals	2	17	20	1
Reading technical manuals	2	22	16	0
Reading study notes and texts on computer	5	20	10	5
TOTAL PERCENTAGES	12 (7,5%)	77 (48,1%)	64 (40%)	7 (4,4%)

Table 1 shows that the students' reading competences fall mostly in the categories of sometimes (48,1%) and rarely (40%) read.

(d) For students' writing sub-skills, the data are as follows:

Table 2
Writing Sub-skills

Category	Always	Sometimes	Rarely	Never
Writing short projects and assignments	6	19	15	0
Taking notes in lectures	21	15	4	0
Writing exam answer	15	17	3	5
Writing text	10	10	17	3
TOTAL PERCENTAGES	52 (32,5%)	61 (38,1%)	39 (24,4%)	8 (5%)

Table 2 shows that the students' writing competences fall in the categories of always (32,5%), sometimes (38,1%), rarely (24,4%), and never (5%) write.

(e) For students' listening sub-skills, the data are as follows:

Table 3
Listening Sub-skills

Category	Always	Sometimes	Rarely	Never
Following lectures	25	10	5	0
Following question/answer sessions in class	11	16	10	3
Listening to spoken presentations	15	18	5	2
Listening to instructions and explanations	22	15	3	0
TOTAL PERCENTAGES	73 (45,6%)	59 (36,9%)	23 (14,4%)	5 (3,1%)

Table 3 shows that students always listen (45,6%), sometimes listen (36,9%), rarely listen (14,4%), and never listen (3,1%).

(f) For students' speaking sub-skills, the data are as follows:

Table 4
Speaking Sub-skills

Category	Always	Sometimes	Rarely	Never
Participating in discussions	11	18	8	3
Asking questions in class	7	7	19	7
Giving spoken presentations	9	18	11	2
Having conversations in English	5	16	14	5
TOTAL PERCENTAGES	32 (20%)	59 (36,9%)	52 (32,5%)	17 (10,6%)

From Table 4, it can be seen that students' speaking competences are 20% always, 36,9% sometimes, 32,5% rarely, and 10,6% never speak in the classroom.

(g) The weaknesses of students' English competences

The results of questionnaire show that the level of students' competences is weak by referring to listening, speaking, reading, writing, grammar, vocabulary, pronunciation, and communication.

Table 5
Level of Students' English Competence

Aspect	Weak	Average	Good	Very good
Listening	20 (50%)	11 (27,5%)	6 (15%)	3 (7,5%)
Speaking	17 (42,5%)	13 (32,5%)	9 (22,5%)	1 (2,5%)
Reading	18 (45%)	14 (35%)	6 (15%)	2 (5%)
Writing	17 (42,5%)	13 (32,5%)	9 (22,5%)	1 (2,5%)
Grammar	25 (62,5%)	12 (30%)	2 (5%)	1 (2,5%)
Vocabulary	19 (47,5%)	12 (30%)	9 (22,5%)	0
Pronunciation	23 (57,5%)	10 (25%)	7 (17,5%)	0
Communication	20 (50%)	13 (32,5%)	6 (15%)	1 (2,5%)

From Table 5, it can be concluded that English competences of students of Engineering Study Program are weak in all aspects. Therefore, it is necessary to give them special treatment in order to improve the students' English competence.

Further results can be presented as follows:

- (a) The results of questionnaire also show that students urgently need an English course that focuses on listening, speaking, reading, and writing.
- (b) English course is very beneficial in Engineering Study Program.
- (c) The courses needed are General English and English for Specific Purposes (ESP).
- (d) It is not sufficient to take an English course only in one semester in Engineering Study Program, but it has to be at least two or three semesters.
- (e) All language aspects like listening, speaking, reading, writing, grammar, vocabulary, pronunciation, writing a CV, and presentation are really needed by students in learning English.
- (f) Students find difficulties in mastering vocabulary, grammar, pronunciation, speaking, and writing.

In addition, the results of interview from two English lecturers in Mechanical Engineering Study Program are as follows:

- (a) Lecturers' background

The lecturers' last education is Master Degree (S2). They have been teaching for 4-8 years. They are full time lecturers in UPS Tegal and do not teach somewhere else.

Their expertise is English Language Teaching especially Listening, ESP, and Curriculum and Material Development(CMD).

(b) Teaching Method

In teaching English, the method used by the lecturers is Student-Centered Learning and Communicative Approach to create active class situation and condition. The material taught is adapted to the students' study program that is Mechanical Engineering. Since the study program does not provide the English course syllabus, the lecturers made their own syllabus by searching the materials from books and the Internet. To encourage students activeness in the classroom, they also train the students to deliver a presentation in groups.

(c) Students' motivation

Based on their observation, the two lecturers find that the students are enthusiastic in learning English, eventhough there are only 25% students who actively speak English in the classroom. The other students tend to be passive, reluctantly use English because they are afraid of making mistakes and shy. They also find English difficult and their vocabulary are limited. Students' reading and writing skills are still weak so that the lecturers have to train them to read aloud and read texts comprehensively. In addition, they also find it difficult to write because their grammar is still weak.

(d) English syllabus

The syllabus used by the English lecturers is the syllabus designed by the lecturers themselves. The material and evaluation in the syllabus were obtained based on observation before teaching by asking the previous lecturers and searching in the Internet. The materials given are related to engineering vocabulary, reading texts on mechanical engineering, writing an English application letter and CV as well as delivering public presentation.

After the students received the materials from the lecturers, the lecturers assessed the students' English competences (listening, speaking, reading, writing, grammar, pronunciation, and vocabulary). It showed that the students' English competence before teaching is 69,75 in average. Meanwhile after teaching, the average score of the students' English competence improved into 76,5. From the results, it is found out that

they have problems in speaking, writing, and are weak in aspects of vocabulary and grammar.

2. Problems Faced by Students in Learning English

Based on the results of students' questionnaire, interview with lecturers, and the students' final examination, the problems faced by students are vocabulary, grammar, and pronunciation mastery. The Engineering students' English competences were in weak category. It can be explained as follows:

Table 7

Level of Students' English Competencies

Aspect	Weak
Listening	20 (50%)
Speaking	17 (42,5%)
Reading	18 (45%)
Writing	17 (42,5%)
Grammar	25 (62,5%)
Vocabulary	19 (47,5%)
Pronunciation	23 (57,5%)
Communication	20 (50%)

Grammar (62,5%) and pronunciation (57,5%) components have the highest percentage. It means that English course in Mechanical Engineering Study Program emphasizes the two components. In addition, listening skill also needs to teach by applying drilling method and listening exercises.

In the classroom, the lecturer should encourage the students to actively speak in groups, for presentation, or performance. Therefore, the students will be excited if they are assigned to practice their speaking skill. One of the methods in order to encourage students to confidently perform is by training them to do role play with peers/partners for short conversations. They also will find it easier to comprehend reading text by doing presentation about things/materials related to their field, for examples, Parts of Vehicle, Welding, and Suspension System. The materials are presented through interesting pictures on presentation slides and the definitions and functions are explained briefly in English. After the presentation, the lecturer reviews the material, gives reward for their effort and success in doing the performance confidently and gives feedback so that they understand about what they have explained. In learning process,

the lecturer should always encourage students to actively communicate by using English.

They considered English to be difficult subject and because of their limited vocabulary, it makes them shy to speak and afraid to make mistake. Therefore, the lecturers should always encourage students to be confident in learning English either inside or outside the classroom. Presentation practice in front of the class can also improve their vocabulary by presenting new terms on their presentation slides. Furthermore, the lecturer will encourage and train them to pronounce the vocabulary so that their pronunciation improves. For grammatical problem, the lecturer gives feedback in the end of presentation related to grammatical use on their slides.

Other problematic aspects in learning English are reading and writing. They don't get used to reading English texts and writing articles in English. It makes them weak in vocabulary mastery. Therefore, the lecturer should train them to read and write frequently. Reading activity that has to be done in the beginning of learning process is by reading English texts aloud. Through this activity, they will be trained to listen to English texts and pronounce them correctly. As a result, they will be accustomed to terms (vocabulary) for the texts they read. After reading aloud, the students are trained to answer questions related to the texts either orally or in written. Through this activity, the students' speaking and writing skills will be continuously trained.

Conclusion

From the research results, it could be drawn conclusions that analyzing students' needs especially before designing syllabus is extremely important. The needs would be the basic information to state the goals and objectives of learning. After that, the materials, teaching method and evaluation could be decided based on the learning objectives. After knowing the students' need, it is needed to know students' problems before teaching. It is useful for lecturers to identify students' characteristics, deliver materials, and give appropriate teaching strategies.

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Biography

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