A Language Needs Analysis of Engineering Undergraduate Students at a Technical University: A Multidimensional Approach

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Abstract

This study investigated the English language needs of engineering students at a state university in Turkey for their academic achievement in the content area courses offered in English. Data were collected from 104 engineering students, 18 EFL instructors, 9 faculty members (subject teachers), 12 engineers and 4 employers through a 5- point Likert type scale adapted from Canbay (2006) and semi-structured interviews. The results of the study indicated that all basic English skills were very important although faculty members prioritized receptive skills. Based on the findings, this study suggests the need to revise the curriculum of the English Preparatory Program of Bursa Technical University (BTU) to fitthe target needs of the students in the content area courses.

Key words: English language, Needs analysis, Curriculum revision, Engineering students

1. Introduction

Turkey introduced English-medium Higher Education in the 1950s in response to the spread of English as the global language of international communication, business, technology and science (Kırkgöz, 2009). At present, all private universities and some state universities where the medium of instruction is at least 30% English have to offer English preparatory programs according to regulations andthese programs provide students with English skills based on grammar, vocabulary, listening, reading, writing and speaking (Çetianavcı & Topkaya, 2012).However, several research

studies conducted in the Turkish contexts (see for example, Kırkgöz, 2009; Özkanal & Hakan, 2010; Yürekli, 2012) show that the majority of present curricular framework of English preparatory programs have not been developed with the consideration of English for Academic Purposes (EAP) or English for Specific Purposes (ESP) and, thus, they all suffer from weaknesses such as inadequate linguistic focus with respect to academic requirements of subject area courses, overwhelming emphasis on English for general purposes, selection of course materials indiscriminately, and lack of business-life related English knowledge (Coşkun, 2013; Karataş & Fer, 2009; Özkanal & Hakan, 2010; Tunç, 2009).

As this very brief analysis of research emphasizes, there is an urgency to design new preparatory programs or revise the existing ones to address university students' academic and job related English language needs and blend them with English language education for a well-rounded educational experience at Turkish universities; a goal which can only be achieved by launching needs analysis (NA) projects. NA is "the process of establishing the what and how of a course" (Dudley-Evans and St. John, 1998, p. 121) with "the systematic collection and analysis of all subjective and objective information necessary to define and validate defensible curriculum purposes that satisfy the language learning requirements of students within the context of particular institutions that influence the learning and teaching situation" (Brown, 1995, p. 36).The context bound nature of any such analysis, on the other hand, requires investigating the needs from different perspectives by including several stakeholders who are providers and beneficiaries of these language programs.

Thus, this study aims to explore whether the existing curriculum of the English preparatory program at a state university in Turkey addresses the language needs of engineering students as perceived by the students themselves, English language instructors, faculty members as insiders,

and engineers and employers in the sector as outsiders and seeks answers to the following research questions:

1. How do different stakeholders assess the importance of basic English language skills in the content area courses?

2. How do different stakeholders assess the importance of listening, speaking, reading and writing tasks in the content area courses?

3. What are the stakeholders' opinions towards the needs analysis project?

2. Needs Analysis and English Preparatory Programs in Turkey

Needs, in language education, can be defined as the gap between a learner's current abilities in a language and the outcomes that s/he is expected to achieve (Richards, 2001). Considering the importance of setting learning outcomes before commencing an educational program, identifying and clarifying the analysis of learner needs helps educators and practitioners shape a fitting curriculum that addresses the specific learning situations. In other words, "rather than fitting students to courses, courses should be designed to fit students" (Nunan, 1999, p. 148). This rationale forms the basis for utilizing NA in educational settings. Once teachers are aware of the target English situations, they will be more effective in creating teaching and learning environments with suitable materials and classroom practices (Benesch, 1996).

In most cases the content in course books used in the English preparatory programs at the tertiary education level in Turkey is adopted as the curriculum and syllabus for English language instructors (Tavil, 2006). Given that these course books are not written with the specific needs of a unique body of students at a particular institution in mind, it would not be an overstatement to say

that they mostly fail to meet the needs of students in their specific academic environments. Despite this limitation, little research has been carried out on NA in Turkey, although it is the cornerstone of curriculum development, especially in creating ESP courses (Dudley-Evans & St. John 1998, p.122).

The existing literature presents few studieson the evaluation of English preparatory programs conducted at state universities in Turkey.A majority of these studies focused on the evaluation of English preparatory courses and learning outcomes with reference to students' academic needs in their departments (Coşaner, 2013; Gerde, 2005; Özkanal & Hakan, 2010) while another study investigated the effectiveness of the preparatory program only (Tunç, 2010). The aforementioned studies used qualitative and quantitative methods to collect data; however, they drew upon data only from students (Gerde, 2005; Özkanal & Hakan, 2010) and students and teachers (Coşaner, 2013; Tunç, 2010) Based on the data collected from students through interviews and questionnaires, Gerede (2005) examined the English Preparatory Program at Anadolu University to assess the curriculum renewal project. The results indicated that students' needs pertaining to the academic requirements of their departmental studies were not met and students underscored that language needs regarding EAP should be integrated into the preparatory curriculum. Similarly, Özkanal and Hakan (2010) assessed the effectiveness of the English Preparatory School at Eskişehir Osmangazi University from the perceptions of students. The results pointed out that students were satisfied with the quality of English education and their instructors; however, there was an agreement upon the unsatisfactory physical conditions and the need for ESP in terms of technical English. In another study, Tunç (2010) surveyed the effectiveness of the Ankara University Preparatory School and found that the program partially served its purpose. In order to make the program more effective, the findings proposed some improvements in physical

conditions, content, materials and assessment dimensions of the program. In the same vein, Coşaner (2013) evaluated the English Preparatory Program at Gazi University based on the experience and reflections of freshman students enrolled in a variety of departments from the faculties of Architecture, Engineering, Sciences, and Economics. According to the results, there were some inconsistencies between the students' language needs and their perceived competencies, and some suggestions were made to improve the content, materials, and assessment aspects of the program.

Therefore, the present study builds upon and expands the previous NAstudies carried out in Turkey by considering the perspectives of multiple stakeholders, (i.e. students, EFL instructors, faculty members, engineers, and employers) while simultaneously focusing on the specific needs of a particular group of students who are enrolled in the departments of Mechanical Engineering, Mechatronics Engineering, and Metallurgy and Materials Engineering. The results of this study are expected to highlight the important tasks and activities pertaining to specific language skills to be stressed at English preparatory classes giving way to detailed recommendations for program improvement at BTU.

3. English Language Needs of Engineering Students

Although a good amount of research exists on language needs of university students in Turkish contexts, to the knowledge of the authors there are only two studies that investigated the specific needs of engineering students based on the perspectives of ESP and EAP. Gozuyesil (2014) investigated the academic English needs of engineering students enrolled at Niğde University Preparatory Program from the perspectives of students and faculty staff. The findings indicated that reading was the most important skill for student academic achievement in their departments. By interviewing subject area teachers and department heads, Canbay (2006) focused on content area

courses rather than the preparatory program itself in his research conducted at Karadeniz Technical University. According to the results, reading was found to be the most important skill, suggesting that more emphasis should be placed on reading through content-based instruction at the English Preparatory Program. According to the results of the aforementioned studies, reading was prioritized, presumably suggesting that prospective engineers may mostly need understanding the written content area materials. Although these two studies in the Turkish context point to a need to help students develop their reading skills in English preparatory classes, it can be noteworthy to remember that educational needs analyses are context bound as this result might be closely related to the language skills of the faculty members that some of the data were driven from. Therefore, there is a need to fully grasp those contextual variables that may cause changes in perspectives regarding English needs of university students. Apart from this concern, surely, the scarcity of research, as shown here, once more emphasizes the need to conduct more studies to understand whether there are recurrent references to certain skills, instructional strategies, particular language tasks and activities stated by different stakeholders. Only a wealth of research can lead us to make some tentative yet significant generalizations that could inform the choices that administrators, program designers, and instructors make in shaping and revising English preparatory programs.

In the international context a number of studies also have focused on the needs of engineering students. Surveying the effectiveness of English language teaching at an engineering college in India, Clement and Murugavel (2015)found a gap between the language teaching methodologies employed at the university level and students' confidence with respect to performing English tasks at the workplace, thus pointing to a mismatch between the goals of English language courses in the engineering department and the professional needs of the students. Similarly, Buriro and Soomro (2013) investigated the needs of undergraduate civil engineering students at a

university in Pakistan from the perspectives of fourth-year civil engineering students and English teachers where productive skills—speaking and writing—were found more important than receptive skills—listening and reading—by the students, while teachers considered all the skills equally important. In another study, where the specific English language needs of engineering students at Presidency University in Dhaka were investigated (Hossain, 2013), it was found thatstudents needed to learn business communication with a particular emphasis on writing and speaking skills.As can be understood from this literature, it is hard to form generalizations from the findings of these studies as all of them reflect the diverse variables particular to the local context. Without a doubt, a plethora of factors influence the perceived needs of different stakeholders at a specific university. These factors include a variety of traits specific to the university, such as the profile ofits students, its established instructional strategies and techniques, the language skills, and competences of its instructors and faculty staff members, the location of the university and the status of this locale in the global economic market, which would in turn effect the requirements for using English in a professional environment. In other words, questions such as “for whom?”, “for what?” and “how?” must be considered when assessing the needs of a particular educational institution, further underlining the importance of conducting a range of NA studies across a multitude of settings. Only by doing so can the literature provide an ample source from which to understand the language needs of engineering students.

While the studies above focused on data collected from one or two stakeholders, there are very few studies that included the perspectives of multiple stakeholders in relation to the specific needs of engineering students. For example, Kim (2013) carried out an NA study with the participation of engineering students, engineering professors and industry workers, the results of whichindicated the importance of business and engineering English. Furthermore, the findings

underscored the necessity for advanced speaking and writing skills in academic and professional life. Likewise, examining the perspectives of multiple stakeholders including employers, civil engineers, civil engineering lecturers, former civil engineering students, and ESP teachers through semi-structured interviews, Kaewpet (2009) focused on the ESP needs of Thai civil engineering students. In the study while all four language skills were considered important, reading was ranked as the most important skill. Based on the stakeholders' recommendations, four communicative events were incorporated in the ESP course: talking about everyday tasks and duties, reading textbooks, reading manuals, and writing daily/periodic reports.

Given that limited research has been conducted on NA from the perspective of multiple stakeholders, especially with the inclusion of outsider perspectives in the industry, the contribution made by these studies is significant yet not enough. As pointed out earlier, there seems to be a huge gap in our understanding of the needs of engineering students that are heavily dependent on unique contextual factors. Therefore, the present study adopts a similar approach that Kawpet used by incorporating multiple informants into its research design with the aim of shedding light on the academic English needs of engineering students at a state university in Turkey.

4. Methodology

In this study, a mixed methods research design that included both quantitative and qualitative data collection techniques was employed to examine the research questions. This type of research design was chosen to obtain more comprehensive results with regards to determining all stakeholders' needs and perceptions towards English language skills in the content area courses. Dörnyei (2007) discusses the pros and cons of combining quantitative and qualitative methods and clearly states that "mixed methods research has a unique potential to produce evidence for the validity of research outcomes through the convergence and corroboration of the findings" (p. 45).

Mackeyand Gass (2005, p.181) corroborated this view, stating that "one method alone cannot provide adequate support."With this in mind, all stakeholders in this study were given a questionnaire, and semi-structured interviews were conducted with a sub-sample of participants in order to triangulate quantitative and qualitative approaches. The setting and participants as well as the data collection instruments and procedure are presented in the following sections.

4.1. Setting and Participants

This study was carried out at BTU English Preparatory Program, BTU Faculty of Natural Sciences, Architecture and Engineering and two automotive companies in Bursa.

Table 1 below describes the organizational structure of the BTU English Preparatory Program by level and skill. The far right column of the table indicates the weight of each skillin the proficiency test.

Table 1

Bursa Technical University School of Foreign Languages Preparatory School System

	Elementary	**Pre-Intermediate**	**Intermediate**	**Upper-Intermediate**	**BTU Proficiency Test**
Writing	4 hours	4 hours	4 hours	4 hours	15%
Speaking	4 hours	4 hours	4 hours	4 hours	15%
Reading*	22 hours*	6 hours	7 hours	7 hours	20%
Listening*	Main Course	16 hours*	7 hours	7 hours	20%
Grammar*		Main Course	8 hours	8 hours	30%
Total	30 hours	30 hours	30 hours	30 hours	100%

* Elementary Main Course class integrates reading, listening, and grammar. Pre-Intermediate Main Course class integrates listening and grammar.

As illustrated in Table 1, the BTU English Preparatory Program offers a modular-based English language teaching system. Each level is comprised of 30 hours of English instruction per week during seven-week periods. While the first two levels—Elementary and Pre-Intermediate—are on the basis of English for General Purposes (EGP), the Intermediate and Upper-intermediate levels aim to serve EAP. The program, on the whole, gives more importance to listening, reading and grammar than the other skills such as speaking and writing. The students who are either successful at the Upper-intermediate level or receive at least 70 points on the BTU Proficiency Test pass the Preparatory Program to continue their academic studies in the related faculties where 30% of the subject area courses are taught in English such as introduction to mechanical engineering, computer programming, thermodynamics, and basic chemistry. BTU senate gives decision on the selection of 30% English medium of instruction courses according to the availability of academics' English language proficiency. Apart from the subject area courses taught in English, two- hour English courses (ENG 101 and 102) are instructed at the Metallurgy and Materials, Mechanical, and Mechatronics Engineering departments in the first academic year.

A total of 104 students, 18 EFL instructors, 9 faculty members, 4 employers, and 12 engineersvoluntarily participated in this research.study. Table 2 provides detailed demographic information for the participants.

Table 2

Demographic Characteristics of the Participants

Label	Categories	*f*	%
Gender	Male	72	30.8
	Female	32	69.2

Students	**Department**	Mechanical Engineering	44	42.3
		Mechatronics Engineering	31	29.8
		Metallurgy and Materials Engineering	29	27.9
	Year	1st	49	47.1
		2nd	45	43.3
		3rd	10	9.6
EFL Instructors	**Major**	ELT	10	55.6
		English Language and Literature	3	16.7
		American Culture and Literature	1	5.6
		Linguistics	1	5.6
		ELT and English Lang and Lit (double)	2	11.1
		Others	1	5.6
	Graduate (MA or PhD	Yes	4	44.4
		No	5	55.6
	Certification	TESOL	2	11.1
		TEFL	1	5.6
		CELTA	1	5.6
		Others	1	5.6
		No Certification	13	72.2
	EGP Experince	1-5 years	4	22.2
		6-10 years	6	33.3
		11-over years	8	44.4
	ESP Experience	0-2 years	8	44.4
		3-5 years	7	38.9
		6-over years	3	16.7
Faculty Members	**Degree in an English Speaking Cunrty**	Yes	4	44.4
		No	5	55.6
	Level of Degree in an English Speaking Country	PhD	1	11.1
		Post Graduate	2	22.2
		MA and PhD	1	11.1
		PhD and Post Graduate	1	11.1
		No Degree	4	44.4
	Teaching Field Subject in English	Yes	4	44.4
		No	5	55.6
Employers	**Abroad Work Experience**	Yes	2	50
		No	2	50
Engineers	**Abroad Work Experience**	Yes	3	25
		No	9	75

As can be understood from the Table, only the students from 1st, 2nd, and 3rd grades were included in this study given that there were not any students enrolled to 4th grade during 2014-2015 academic year. While most of the EFL instructors have over 6 years EGP experience, only few of

them have ESP experience for over 6 six-year period of time. On the other hand, the faculty members who have a graduate degree in an English speaking country teach their subject matter courses in English. Additionally, half of the employers participated in this study have abroad work experience while one fourth of the engineers have worked abroad before Turkey.

3.2. Data Collection Instruments and Procedure

The data for this study were collected from the stakeholders in October ofthe 2014-2015 academic year. The data collection procedures aresummarized in Table 3 below.

Table 3

Data Collection Procedures

	Phases	Data Collection Instruments	Stakeholders	Aims
RQ1&2	1	NA Questionnaire	• Engineering Students • EFL Instructors • Faculty Members • Engineers • Employees	To determine the basic English language needs of engineering students in the content area courses To assess the importance of 4 skills tasks and activities in the content area courses
RQ3	2	Semi-structured interview	• Engineering Students • EFL Instructors • Faculty Members • Engineers • Employees	To identify the stakeholders' opinions towards needs analysis project and triangulation of quantitative data

The data collection procedures were divided into two phases. In the first phase, the NA questionnaire developed by Canbay (2006) was implemented in two main parts in order to assess the most important English language skills and specific tasks and activities pertaining to each skill The first part aimed to collect background information about the participants while the second part focused on English language needs under five sections based on a Likert-type scale with anchors

arranged from least important to most important (1: not important, 2: not very important, 3: important, 4: fairly important and 5: very important). The sections included the items written to elicit English tasks, classroom practices, and instructional methodologies that can be implemented at the preparatory year program. The data obtained from the NA questionnaire were analyzed by using the Statistical Packages for Social Sciences (SPSS 20). A descriptive research design was utilized at this stage. Each stakeholder's mean scores were calculated, grouped and presented in graphs and tables. The scale below was used to interpret the quantitative data. The interpretation of mean values was dependent on the calculation of accepted boundaries of each response, which were obtained by dividing the serial width 4 by the number of responses 5 and found to be 0.8 (Topkaya, 2010, p.147):

1) Not Important (NI):	values between 1.00 and 1.80
2) Not very important NVI):	values between 1.81 and 2.60
3) Important (I):	values between 2.61 and 3.40
4) Fairly Important (FI):	values between 3.41 and 4.20
5) Very Important (VI):	values between 4.21 and 5.00

In the second phase, 12 randomly selected participants (4 students, 3 EFL instructors, 3 engineers, and 2 employers)voluntarily participated in the interviews and they were emailed a semi-structured interview in order to find out their implicit thoughts towards the needs analysis project and triangulate the quantitative data. The responses were analyzed based on common and recurring themes by utilizing thematic content analysis.

Although Canbay (2006) employed the questionnaire to investigate the language needs of the engineering students at a Turkish state university, a pilot study was conducted before the main

study to ensure the contextual validity of the survey. Firstly, the NA questionnaire was administered to 13 EFL instructors and 4 faculty members. Based on the feedback, three new items were added to the questionnaire including "taking notes while listening to audio and video recordings", "taking notes while reading", and writing informal texts (emails, short texts in social networking sites)". After that, the newly adapted NA questionnaire with a number of 60items was applied to 40 volunteer undergraduate engineering students. Finally, Cronbach's Alpha test was conducted in order to measure the internal consistency of the new items and to check the extent to which items in the NA questionnaire related to each other. According to the result of this test, the Cronbach's Alpha value was 0.93 overall, which meant the scale was highly reliable. Table 1 shows the Cronbach's Alpha values of each section in the NA questionnaire ranging from 0.75 to 0.89, indicating an acceptable level of consistency.

Table 4

Cronbach's Alpha Analysis Results

Section	**Cronbach's α**
Speaking	0.86
Listening	0.75
Reading	0.84
Writing	0.89

4. Findings

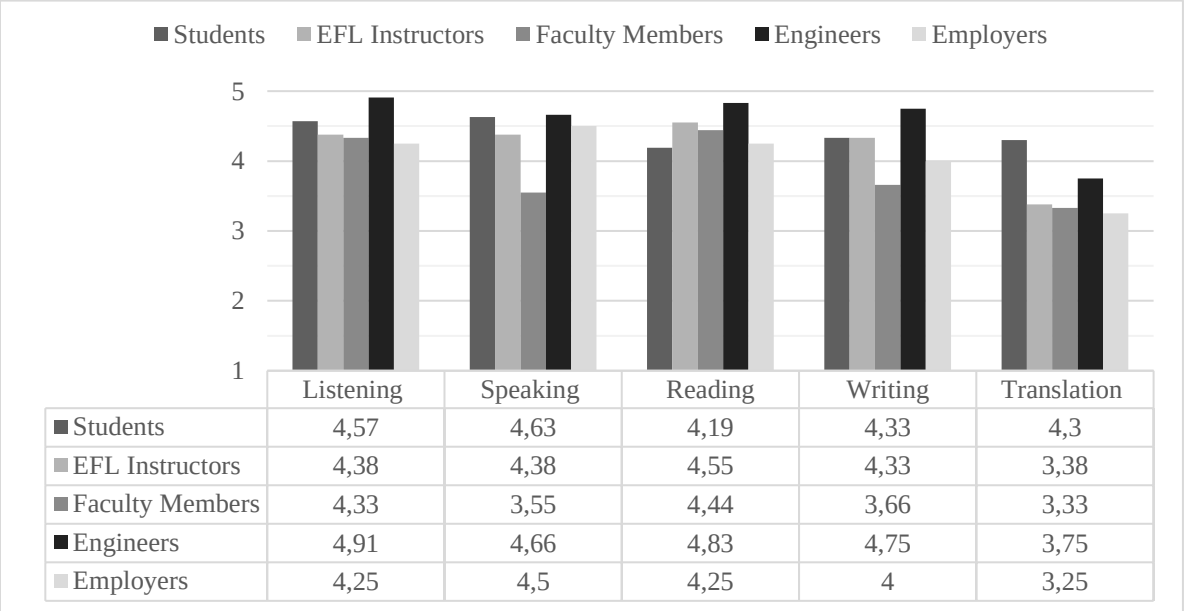
As stated before, the data for this study were collected through qualitative and quantitative methods. The findings are presented and discussed under the related research question in this section.

ResearchQuestion 1: How do different stakeholders assess the importance of basic English language skills in the content area courses?

As Graph 1 illustrates, all stakeholders considered receptive skills—listening and reading—very important. However, according to the findings, translation was perceived to be the least important skill overall. When the results are examined individually, it can be seen that students thought almost all the skills were very important. On the other hand, faculty members considered productive skills—speaking and writing—less important while the participants from the sector put the highest priority on every skill except translation. The inconsistent results reveal a lack of consensus among stakeholders on the priority of basic English language skills needed in the English preparatory program curriculum to ensure students' academic achievement in the content area courses.

Graph 1

The Opinions of Stakeholders' about the Importance of Basic English Language Skills



	Listening	Speaking	Reading	Writing	Translation
Students	4,57	4,63	4,19	4,33	4,3
EFL Instructors	4,38	4,38	4,55	4,33	3,38
Faculty Members	4,33	3,55	4,44	3,66	3,33
Engineers	4,91	4,66	4,83	4,75	3,75
Employers	4,25	4,5	4,25	4	3,25

Research Question 2: How do different stakeholders assess the importance of listening, speaking, reading and writing tasks in the content area courses?

Table 5ranks speaking tasks and activities according to their mean values. The values vary between 3.57 and 4.54, indicating that all the sub-skills pertaining to speaking fell between the degree of either fairly important or very important. According to the results, “conveying the message while speaking,” “intelligibility / comprehensibility while speaking” and “asking and answering questions in class” were reported to be the most important speaking tasks by the students, EFL instructors, and engineers. Looking at the most and least important items in Table 5, it can be inferred that maintaining effective and academic oral communication is mostly an important skill for engineering students.However,faculty members do not expect the students to have grammatical accuracy or native-likeaccents in their content area courses as well as fluency in the target language and interacting with the foreigners about the subject field. This result indicates that faculty members do not prioritize communicative use of the target language in students’ academic life drawing a sharp line between foreign language requirements of their courses and real life situations. Additionally, they do not put emphasis on the use of English outside EAP and ESP situations by assigning the lowest score to the item “speaking in informal daily life situations.” Moreover, the ability to speak in the seminars was not considered to be a crucial skill by students and faculty members, while engineers and employers highlighted its importance, showing that seminar may not be used as an instructional method at the faculty, whereas it is a salient requirement in the work place. This dichotomy between the faculty and the sector may refer the discrimination between EAP and ESP again, indicating that “speaking in the seminars” might not be an academic skill but rather a job-related activity. Another clash in terms of the methodology between the participants from the sector—engineers and employers and the participants from the

faculty—faculty members and students is classroom discussions. It is apparent from the results that classroom discussion is not a preferred technique in engineering courses at the faculty. Given that the aforementioned academic tasks including seminar and classroom discussion are partly ignored by the faculty members and students, further needs analysis can be conducted with the employment of observations to explore the commonly used instructional strategies in the engineering courses.

Table 5

Ranking of Most Important Speaking Tasks and Activities

Speaking Tasks and Activities	**ST**	**INS**	**FM**	**ENG**	**EMP**	**Mean**
Conveying the message while speaking	4.55	4.83	4.11	4.66	3.50	**4.54**
Intelligibility / comprehensibility while speaking	4.36	4.72	3.55	4.66	3.75	**4.36**
Asking and answering questions in class	4.19	4.72	4.00	4.66	4.25	**4.28**
Making presentations/presenting oral reports	4.01	4.77	4.11	4.83	4.50	**4.19**
Speaking to foreigners about their subject	4.14	4.33	3.55	4.58	4.25	**4.17**
Fluency / accuracy in speaking	4.14	4.22	3.11	4.16	4.25	**4.09**
Using academic vocabulary while speaking	4.05	3.94	4.00	3.91	3.50	**4.01**
Speaking in the seminars	3.90	4.11	3.44	4.16	4.25	**3.93**
Participating in classroom discussions	3.87	4.16	3.77	4.08	4.25	**3.93**
Speaking in informal daily life situations	3.96	3.61	2.88	4.25	3.75	**3.87**
Using non-academic vocabulary while speaking	3.67	3.72	3.11	4.00	3.25	**3.65**
Pronunciation / accent in speaking	3.75	3.61	2.88	3.25	3.75	**3.63**
Grammatical accuracy while speaking	3.50	3.83	3.11	4.00	3.75	**3.57**

As presented in Table 6,the in-class listening activities “understanding words and expressions in English used in the lectures” and “understanding instructions given in English in the lectures” were reported to be two of the most important listening sub-skills for students’ achievement in content area courses. According to the results, faculty members seem to disregard the interaction with the foreigners in their field by assigning the lowest score to “understanding foreigners studying the same discipline” similar to the findings for the speaking task—speaking to the foreigners in the same filed while stakeholders from the sector put a great deal of importance on these items. Considering these two parallel findings, faculty members may be regarded to lack intercultural awareness to some extent and the importance of international contact in the business life regarding the engineering field. Additionally, the academic staff members including EFL

instructors and faculty members do not aim to train their students to be engaged in daily life interactions. However, the other three stakeholders prioritized the skill to "understand the daily life conversations", probably referring that students' wants should also be minded while developing English preparatory schoolcurriculum and determining the objectives of the program.Finally, the results indicate that students should acquire the listening competencies centered on academic achievements. As such, the English language curriculum may be revisited to integrate appropriate materials and assignments in order to increase students' preparedness for content area courses.

Table 6

Ranking of Most Important Listening Tasks and Activities

Listening Tasks and Activities	ST	INS	FM	ENG	EMP	Mean
Understanding words and expressions in English used in the lectures	4.46	4.72	4.33	4.50	4.50	**4.48**
Understanding instructions given in English in the lectures	4.33	4.77	4.22	4.50	4.75	**4.40**
Understanding foreigners studying the same discipline	4.31	4.44	3.89	4.50	4.50	**4.32**
Understanding seminars/presentations in English	4.20	4.55	4.22	4.33	4.50	**4.26**
Understanding daily life conversations	4.10	3.88	3.44	4.58	4.00	**4.07**
Understanding materials in English (e.g. video programs, audios)	4.02	4.50	3.77	4.08	4.00	**4.07**
Taking notes while listening to audio and video recordings	3.91	4.33	4.22	3.83	4.25	**3.98**

According to Table 7, the reading related items considered to be very important are "reading lecture handouts," "reading textbooks" and "reading on the internet (e.g. e-mail messages, web sites)."The results imply that students should be able to understand hard and soft written materials about their field in order to be successful in the content area courses. Therefore, the reading curriculum of the English Preparatory School at BTU may be revised by varying the course materials and assignment types to meet the needs of the students before they start their studies in their departments. Looking into the individual scores of each stakeholder, it can be seen that EFL instructors generally assigned the highest scores to the reading tasks and activities, referring that they may have isolated themselves from the realities of the sector and expectations of faculty

members and students. Additionally, students and faculty members seem to put some basic reading skills in a secondary place such as reading for general and specific information, reading for main idea, drawing conclusions, understanding logical relations within the text and writer's point of view or attitude. These results may indicate that engineering students and professors consider reading as an important language skill to understand field notes that does not necessarily require interpretation skills given that they are mostly factual texts but not literary texts. In the same vein, "making inferences while reading" was reported to be the second least important skill with a consensus of all the stakeholders, possibly meaning that the students will be engineers rather than men of letters in their professional lives. Another conflicting finding is related to note-taking skill which was placed the greatest importance only by EFL instructors, referring that students and faculty members may have become a part of an education system based on rote-learning in which students are provided with ready-made lecture notes. In essence, the preparatory program may be revisited and priorities of the curriculum in terms of reading skill may be reviewed based on the aforementioned findings.

Table 7

Ranking of Most Important Reading Tasks and Activities

Reading Tasks and Activities	**ST**	**INS**	**FM**	**ENG**	**EMP**	**Mean**
Reading lecture handouts	4.30	4.72	4.33	4.33	4.25	**4.36**
Reading text books	4.32	4.38	4.22	4.16	4.25	**4.31**
Reading on the internet (e.g. e-mail messages, web sites)	4.22	4.55	4.00	4.33	4.75	**4.27**
Reading articles from weekly magazines / periodicals / journals	4.05	4.61	4.66	4.25	4.25	**4.18**
Reading instructions booklets / user manuals	4.10	4.44	4.33	4.08	4.00	**4.15**
Reading reports	4.04	4.66	4.00	4.25	4.25	**4.14**
Interpreting graphs, charts, tables etc.	4.12	4.27	4.11	4.08	4.00	**4.13**
Reading reference books (e.g. Encyclopedia, dictionaries)	4.00	4.55	4.55	4.16	4.25	**4.12**
Reading for specific information	3.96	4.72	3.88	4.25	4.00	**4.07**
Reading for general information	3.93	4.66	3.66	4.16	4.25	**4.03**
Reading for main idea	3.90	4.22	3.66	4.00	3.75	**3.93**
Drawing conclusions while reading	3.85	4.38	3.44	4.16	4.25	**3.93**
Understanding logical relations within the text while reading	3.90	4.38	3.44	3.83	3.50	**3.91**
Understanding the writer's attitude / point of view while reading	3.91	4.00	3.44	3.83	4.75	**3.91**

Scanning for unknown words in general while reading	3.90	3.88	3.66	4.00	4.00	**3.89**
Recognizing terminology while reading	3.77	4.22	3.77	4.16	4.00	**3.87**
Making inferences while reading	3.76	3.94	3.66	3.75	3.50	**3.77**
Taking notes while reading	3.59	4.33	3.33	4.00	3.75	**3.70**

When the results presented in Table 8 are examined, it can be seen that the only very important item is "appropriate use of non-academic vocabulary in writing." The rest of the items were reported to be fairly important for students' achievement in content area courses. The top three items in the table indicate that students should be able to use a wide range of vocabulary and convey the take-away of the topic in their written products. When the items related to writing skill are further scrutinized, it can be concluded that the expectations of students and faculty members from writing skill in terms of classroom practices or assignment task types differentiated from EFL instructors' and the stakeholders'in the sector. To illustrate, faculty members assigned the lowest score to "writing projects", which may indicate that it is an academic skill that students should acquire at the graduate degree or when they start working in the sector. Alternatively, projects may be written in Turkish rather than English in the engineering field. Moreover, basic writing skill requirements such as originality of thoughts, sequence of ideas, adequate developments of ideas, relevance of ideas or appropriate connections between ideas were reported to be less important by the faculty members compared to other stakeholders. These findings indicate that the assignments that require writing skills are not preferred types of instructional practices. Students' and faculty members' lower scores assigned to tasks such as writing essays, lab-reports, business letters, and note-taking in the class confirm that writing is not a favored learning and teaching tool in subject area courses. In conclusion, assignment types in writing classes during preparatory year can be revised accordingly with the classroom practices of departmental studies.

Table 8

Ranking of Most Important Writing Tasks and Activities

Writing Tasks and Activities	ST	INS	FM	ENG	EMP	Mean
Appropriate use of non-academic vocabulary in writing	4.28	4.11	4.00	4.33	4.25	**4.25**
Good expression of the main idea in writing	4.11	4.55	4.00	4.41	4.50	**4.19**
Use of academic vocabulary in writing	4.09	4.77	4.11	4.08	4.25	**4.18**
Relevance of ideas to the text in writing	4.11	4.61	3.44	4.25	4.25	**4.14**
Preparing presentations	3.99	4.66	4.00	4.58	4.75	**4.14**
Appropriate connections between ideas in writing	4.12	4.55	3.33	3.83	4.25	**4.10**
Writing projects	3.98	4.38	3.33	4.58	4.50	**4.05**
Sequence of ideas in writing	3.98	4.61	3.66	3.91	4.00	**4.03**
Grammatical accuracy in writing	3.98	4.33	4.00	4.00	4.25	**4.03**
Adequate development of ideas in writing	3.96	4.61	3.33	4.00	3.75	**4.00**
Answering short-answer question types in exams	3.82	4.50	4.11	4.16	4.25	**3.96**
Writing business letters/personal letters/CV	3.84	4.38	3.66	4.33	4.50	**3.95**
Originality of thoughts in writing	3.96	4.38	3.55	3.50	3.75	**3.94**
Writing essays	3.90	4.11	3.77	3.91	4.00	**3.92**
Taking notes in the class	3.72	4.44	3.88	4.16	4.00	**3.86**
Writing lab reports	3.74	4.44	3.88	4.00	3.75	**3.85**
Writing research papers	3.75	4.16	3.33	4.33	3.75	**3.82**
Writing informal texts (email, short texts in social networking sites, etc.)	3.85	3.83	3.44	3.91	3.75	**3.82**
Writing descriptions of experiments	3.63	4.44	3.44	3.83	4.25	**3.75**
Mechanics (spelling, punctuation, format, etc.)	3.62	4.61	3.44	3.58	4.25	**3.74**
Writing summaries/abstracts	3.54	3.94	3.55	4.33	4.50	**3.68**
Writing critiques of an article	3.55	3.61	3.33	3.83	4.00	**3.58**

Research Question 3: **What are the stakeholders' opinions toward the needs analysis project?**

Semi-structured interviews were conducted with 12 participants to find out their implicit feelings and thoughts aboutthe needs analysis research and to triangulate the quantitative data. Participants were represented with a label and a letter such as Employer A, Engineer C, Student A, in order to ensure the confidentiality of the participants' identities. In order to answerthe third research question, the findings were categorized in five sections: the degree of importance of English language skills for engineering students, the professional English language skills needed by prospective engineers, the curriculum design of the English Preparatory Program for engineering students, ESP courses in English preparatory classes, and views on the Needs Analysis Project.

The Degree of Importance of English Language Skills for Engineering Students

The participants were asked to rank the importance of language skills for engineering students at the BTU English Preparatory Program. The opinions of employers and engineers

showed similarities in that both stakeholders primarily gave importance to speaking, listening, and writing skills. Similar findings can be derived from the ratings of engineers and employers that they assigned to the most important basic English language skills (see Graph 1). In general, they claimed that a prospective engineer should not only communicate in English well but also comprehend all kinds of texts in the sector. One employer made the following comment:

> "The ranking of English language skills is closely related to the department which an engineer works for. For instance, if s/he works for a technical department such as Engineering, Production, R&D etc. reading and writing skills gain more importance." (Employer A)

Students' views were similar to employers' and engineers' and this finding can be triangulated by the results obtained in Graph 1 where students prioritized all language skills except translation. Although students assigned lower scores to the related items in Table 8, most of the interviewed students mentioned the importance of communicating in English both verbally and literally such as writing business emails, reviewing lab reports, and participating in projects in the field. This contrastive finding might refer to the gap between real life expectations or wants of the students and instructional practices of subject area courses. One student commented on the most required English skills as follows:

> "Reading and writing skills are quite crucial. Not only Turkish engineering texts but also English ones should be reviewed. You cannot produce without reviewing available texts." (Student A)

During the interviews, most of the EFL instructors claimed that reading and listening skills are highly important. The findings in Graph 1, however, revealed that EFL instructors give high importance to all basic language skills except translation. This conflict may stem from the English Preparatory Program curriculum's influence on EFL instructors (see Table 1) in which particular importance is attached to reading, listening and grammar courses. The comment made by an EFL instructor about the most necessary skills is as in the following:

> "An engineer is in the position of producer. S/he needs to understand to produce. Thus, s/he firstly must comprehend what s/he reads and listens. Unfortunately, since we are not the one who creates technology, we have always needed to cite texts about technology or engineering from their primary sources. The transfer of these primary sources into productive skills place speaking and writing skills in a primary stage." (EFL Instructor A)

Table 9 below summarizes the information from the first category. It is clear that engineering students, engineers and employers shared the common view on the necessity of English skills for communicative purposes. In summary, engineering students, engineers and employers focused on the pragmatic aspects of English language skills in business life while EFL instructors prioritized receptive skills.

Table 9

Views on English Language Skills

Category	Stakeholders	Views
The Degree of English Language Skills according to the participants	Engineering Students	English skills for communicative purposes
	EFL Instructors	Reading and Listening skills
	Engineers	English skills for communicative purposes
	Employers	English skills for communicative purposes

The Professional English Language Skills Needed by Prospective Engineers

Employers and engineers claimed that English communicative skills would make them better engineers. Moreover, they also noted the importance of the appropriate use of vocabulary in language fluency and accuracy. One of the employers made the following comment:

> "In the professional life, speaking fluent English with rich vocabulary knowledge has gained importance instead of having just good grammatical knowledge. A good engineer should have the basics of technical terminology or jargon and use them both accurately and fluently in the sentences because English language skills should focus on productive aspects of language instead of grammatical rules." (Engineer B)

Withrespect to English language skills, a student commented as follows:

> "A prospective engineer should speak English fluently, comprehend well, and have high communication abilities in English." (Student B)

EFL instructors also regarded language skills as necessary for communicative purposes in professional business life. The skills that engineers should possesscan be categorized as presentation skills, socializing both at work and business lunches, emailing, and active participation in business meetings.

Table 10

Views on English Language Skills in the Professional Business Life

Category	Stakeholders	Views
English Language Skills in the Professional Business Life	Engineering Students	Appropriate use of vocabulary in engineering contexts
	EFL Instructors	Presentation skills Socializing at work
	Engineers	Technical terminology Jargon Communicative skills
	Employers	Jargon Communicative skills

According to the information in Table 10, it can be seen that all stakeholders agreed on the importance of communicative abilities for a prospective engineer. Furthermore, engineering students, engineers and employers stated the importance of appropriate vocabulary use and jargon.

These findings can be corroborated by the quantitative data in which appropriate use of non-academic vocabulary in writing and effective oral and auditory communication skills were ranked as the top sub-skills. However, students, engineers, and employers overwhelmingly underscored engineering vocabulary which was not mentioned in the needs assessment survey. As such, an ESP course can be developed to deliver engineering terminology to the students at the faculty in cooperation with EFL instructors and faculty members.

The Curriculum Design of the English Preparatory Program for Engineering Students

Employers and engineers believed that technical items should be inserted into the curriculum of English preparatory schools. One of the engineers offered the following comment about the preparatory program for engineers:

> "Course contents should save engineering students from the position of a receiver or cups to be filled in, but guide them to produce business English for engineering purposes. This point is important because acquiring or learning English for specific purposes takes years." (Engineer C)

Students' attitudes toward the curriculum of an English preparatory school also addressed the necessity of inserting technical items. Furthermore, students would like to take courses such as academic presentation skills and effective communication strategies. According to the findings in Table 5, making presentations was reported to be one of the top important speaking skills, indicating that prospective engineering students should be provided with a course curriculum which trains them on presentation skills.

EFL instructors provided detailed feedback on curriculum design, emphasizing that can-do-list learning outcomes should be defined for each skill, referring to the eminence of course objectives and outcomes in the curriculum design. This study may have made them realize how important it is to determine learning outcomes based on the assessment of the students' needs.

Theyalso stated that as an introduction to their faculty courses, it should be continued to offer EAP courses to the students at the higher levels of the Preparatory Program, such as at the Intermediate and Upper-intermediate levels. In addition, reading passages and writing activities should include topics related to engineering in order to teach basicengineering terminology, albeit especially students and faculty members did not overrate the ability to recognize terminology while reading in Table 7.The views of the stakeholdersare summarized in Table 11.

Table 11

Views on English Preparatory Program Design

Category	Stakeholders	Views
English Preparatory Program Design	Engineering Students	English for engineers Academic presentation skills
	EFL Instructors	Inserting EAP and engineering contexts into Intermediate and Upper-Intermediate levels
	Engineers	Business English context English for engineers
	Employers	Business English context English for engineers

ESP Courses in English Preparatory Classes

Employers and engineers were skeptical as to whether ESP courses should be taught as a separate course. In terms of developing ESP curricula for preparatory students, one engineer commented as follows:

> "Preparatory class is too early to start a full ESP program since a SFL student might not have any ideas about the engineering department s/he attends. Thus, these students will have decided their career paths when

> they become senior students. For example, a prospective engineer hoping to work in sales department will probably need speaking skills, the one hoping to work in R&D will need advanced reading skills or the one dreaming about academic career of engineering will need both reading and writing. That is to say, a full ESP course should be covered at faculties instead of English preparatory programs." (Engineer D)

Students claimed that ESP courses would be beneficial at preparatory schools. However, they underlined that only the basics of ESP content should be covered, such as math jargon and basic engineering terms.

Similar to the stakeholders from the engineering sector, the EFL instructors also seemed reluctant about ESP courses in English preparatory classes. An EFL instructor made the following comment:

> "I am not sure about it because ESP might not be covered in lower levels. When students do not have enough capacity to go further with ESP, it would demotivate them. However, ESP vocabulary or academic words could be covered especially in Upper Intermediate or Intermediate levels." (EFL Instructor B)

To summarize, all stakeholders stated that conducting a full ESP curriculumat an English preparatory school would challenge the program itself. According to the stakeholders from the sector, students should be exposed to an ESP program at their faculties.However, all stakeholders agreed that technical terms related to engineering field should be incorporated into the skills-based courses of preparatory programs. The comments made by the interviewees revealed that the stakeholders may have a limited understanding of ESP which is composed of only occupational vocabulary and structures.

Views on the Needs Analysis Project

Employers, engineers, students, and EFL instructors stated that incorporating theopinionsof multiple stakeholders would make the English curriculum at BTUmore effective and meaningful as compared to building it on the personal beliefs of an individual group. People inthe sector specifically noted that an English preparatory program based on NA wouldproduce better prospective engineers with professionally required language skills. These findings revealed that participants were fully aware of the importance of filling the gap between English at school and the workplace.

5. Conclusion and Discussion

The present study primarily investigated the English language needs of undergraduate engineering students in the content area courses based on the data collected from multiple stakeholders. According to the findings obtained from questionnaires and semi-structured interviews, translation was not considered to be as important as the other basic English language skills by the other stakeholders, except for the students. Rather, faculty members prioritized receptive skills—listening and reading—for students' achievement in the content area courses. The current curriculum of the BTU English Preparatory Program puts greater emphasis on reading, listening and grammar. However, the results revealed that all language skills are equally important as found by Kaewpet (2009) who adopts a multi-perspective approach by investigating a variety of stakeholders similar to this study. In contrast, students highlighted the importance of productive skills while teachers prioritized all language skills in Buriro and Soomro's (2013) study.

One important finding similar to those of Özkanal and Hakan's (2010) and Kim's (2013) underscores the necessity of teaching technical English at preparatory program. However, engineers and employers suggested that ESP courses should not be delivered to the students during preparatory year. Bearing this in mind, it can be asserted that developing an ESP course or

integrating technical English into English curriculum should require a macro-level policy and cooperation between English preparatory program and the Engineering faculty.

Although Gözüyeşil (2014) and Canbay (2006) found reading as the most important skill in their studies investigating the language needs of engineering students in Turkey, the results of the presentresearch put equal emphasis on four basic language skills. This contrast, nevertheless, evokes the site-specific nature of needs assessment studies which is closely associated with contextualvariables. With this in mind, it can be affirmed that institutional NA studies should be conducted continually instead of merely developing a curriculum based on the findings of the existent body of literature.

Another significant finding of this study points to the gap between English preparatory program and the Engineering faculty departments in terms of preferred instructional practices in the content area courses. Similar to the finding suggested by Clement and Murugavel (2015), it can be postulated that there should be consistency among the objectives of English courses at the preparatory program curriculum, language teaching methodologies, and the priorities of the faculty regarding classroompracticesemployed in the content area courses, which can also serve the purpose for completing English tasks at the workplace.

6. Implications for English Preparatory Program Revision

The current English Program of BTU is based on a system aiming to teach students EGP and EAP, which currently focuses on improving the academic English requirements in the content area courses. However, the present study found important results that could help the Preparatory Program administration and curriculum developers innovate the program. The multi-dimensional approach to the current needs assessment project implies an essential point in curriculum development, in that the voice of all stakeholders should be heard to unite students' needs and

course syllabi. In this respect, the findings of this needs assessment study offer a wide range of implications for revising the preparatory program as follows:

- English curriculum should be revised to include abalanced distribution of skills courses with regards to their weekly hours of instruction in the English Preparatory Program.
- Accordingly, the percentages of skills in the assessment process and procedure can also be revised.
- Tasks and activities pertaining to individual skills can be updated based on the most important sub-skills defined by the stakeholders. In doing so, the program staff who are responsible for renewing the curriculum should make necessary changes not only in the content but also in the materials, activities and assessment procedures in order to address the specific needs of the students related to EAP.
- Based on the findings of the research, it is disputable whether ESP should be integrated in English curriculum at the Preparatory Program. The participants favor integrating the ESP courses after the students reach a certain level of English language proficiency. However, there was agreement on the integration of ESP components in terms of technical vocabulary in skills-based courses.

Finally, this study may build a bridge, so to say, between engineering faculties and the industry in terms of understanding and meeting the two extremes' expectations about required English language skills for prospective engineers. The conclusions and implications stated above may provide English program staff with a sound basis for future curriculum renewal projects. However, in order to keep the dynamic nature of the English Preparatory Program at BTU, further NA projects will be needed to determine the target needs of the students continually.

6. Limitations

This study comprised a variety of stakeholders including a great number of students from 1st, 2nd, and 3rd years. Given that BTU is a recently founded university, there were not any 4th year students enrolled to the departments during 2014-2015 academic year. As such, further NA studies canincorporate the views of the future BTU seniors into curriculum renewal and revision projects. Another limitation is the number of faculty members that participated in this study, in that the researchers were able to reach only 4 engineering professors out of many for the surveys; none of them responded to interviews, suggesting a lack of communication and cooperation between the Engineering faculty and English Preparatory Program at BTU. Additionally, the sectoral stakeholders included employers and engineers only from the automotive sector although participant students of this research can work in different sectors of the industry. As such, further NA studies can collect data from a broader scope of industries to better capture the diverse needs of students in the Preparatory Program.

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