ASSESSING ACADEMIC AND PROFESSIONAL ENGLISH LANGUAGE NEEDS OF IRANIAN RAILWAY ENGINEERING STUDENTS: A TRIANGULATED EVALUATION STUDY

Mahmood Reza Atai & Seyyed Asadollah Asadi
(*Kharazmi University, Tehran, Iran*)

Abstract

Given the highly accountable nature of current university education, needs analysis should lay the foundation for English for Specific Purposes (ESP) programs. The School of Railway Engineering at Iran University of Science and Technology (IUST), Teheran, is the only school of Railway Engineering (RE) in Iran. However, no needs analysis and evaluation project has ever been conducted. Thus, this study examines the academic and professional English language needs of undergraduate students of RE as well as the graduate students at the workplace. To this end, a triangulated approach was adopted involving observations, interviews, questionnaires, and course book analysis. Participants were a wide range of stakeholders including students of RE, their instructors, language teachers, authorities and graduate railway engineers at the workplace. The results revealed that the ESP programs under study do not meet either railway engineering students' or engineers' needs. The findings may provide some implications for renewing the ESP programs and enhancing accountability of ESP instruction in higher education.

1. Introduction

ESP curriculum planning is conspicuously coupled with needs analysis (Belcher 2006; Dudley-Evans & St John 1998; Hyland 2006). Without needs analysis, all downstream decisions from curriculum design to classroom practice would be biased because of personal beliefs and sometimes misunderstandings. Lack of common ground for policy-making would, in turn, result in scattered components in different layers of an educational system. Such a disappointing situation where all participants involved in each layer of education perform independently from one another was discussed by Atai (2002) in the context of an Iranian English for Academic Purposes (EAP) curriculum at university level.

Similarly, as Belcher (2006) argues, needs analysis works out the route and specifies the goals and objectives that both decision makers and practitioners wish to accomplish. Neglecting needs analysis then creates a gap between students' and teacher's expectations which in turn makes the classroom environment unpleasant for all. Consequently, students gradually form negative impressions and attitudes towards ESP programs, and students fear they would not survive in academic environments

because of their inadequate knowledge of English. A second and more serious concomitant of this ignorance is the wide gap between English programs at university and the realities of the graduates' future career.

In spite of the tremendous importance of needs analysis in EAP courses, it is not needs analysis but intuition that moulds EAP programs in Iranian higher education from planning to implementation (Atai 2002). It is argued that the current EAP education is not supported by evaluation evidence. As a result, it is crucial to study the whole program including materials, teaching and learning practice, the assessment scheme and, finally, the relationship between EAP curricula and language requirements in professional contexts. Therefore, this study examines the academic and professional needs of the Iranian students of Railway Engineering (RE) at university and workplace using a triangulated approach. Professional needs in this study are analogous with Hutchinson & Waters' (1987) target needs defined as what graduate students need to carry out at the workplace. Investigating the engineers' target needs is mainly motivated by the current close bond between the school and professional sites of Iranian railway industry.

2. Review of the literature

Beginning in the 1920s, as West (1994) contends, needs analysis has evolved in terms of scope, sources, and methodology. ESP scholars (e.g. Hutchinson & Waters 1987; Robinson 1991) introduced the concept as an umbrella term covering both objective and subjective needs, including present and target situation, learning needs, necessities and wants. Hyland (2006: 73) sums up needs analysis as "techniques for collecting and assessing information relevant to course design; it is the means of establishing the *How* and *What* of a course." Dudley-Evans & St John (1998) had already introduced the notion of rights analysis: Hyland (2006: 79) maintains that rights analysis involves "evaluating the findings of needs analysis, recognizing the challenges that students face and interrogating the results to create more democratic and participatory involvement by students in decision making." In the same vein, Benesch (1996) argues that critical needs analysis holds that the target situation is associated with potential reforms in terms of the hierarchical nature of social institutions and inequality, both inside and outside the institution.

Parallel with theoretical advances, Long (2005) presents a comprehensive list of needs analysis data collection procedures and stresses that researchers should exploit multiple methods. A triangulation approach calls for embracing a variety of methods and sources of data incorporating experts, non-experts, language learners, content and language teachers, materials developers and decision-makers. The rationale behind the significance of triangulation, as Robinson (1991: 7) maintains, is that "needs do not have of themselves an objective reality. What is finally established as a need is a matter for agreement and judgment not discovery."

The aforementioned conceptualizations have been realized by practitioners, manifested in a substantial number of needs analysis projects in the current literature (Cowling 2007; Tarone & Kuehn 2000, to name but a few). Ferris (1998) collected the views of a composite group of college students of business, physical and biological sciences, and engineering and computer sciences in an international university towards

their instructors' requirements regarding listening and speaking skills as well as their perceptions concerning the importance of certain academic aural/oral skills or tasks. To elicit both engineers and non-engineers' opinions about the contribution of their former ESL writing course to their academic content courses, Leki & Carson (1994) utilized a survey method. Also, in an attempt to design a course for immigrant students on the basis of needs analysis, Bosher & Smalkoski (2001) assessed the learners' needs through interviews and observations.

Pholsward (1993) examined the language skills computer engineers mostly needed at the workplace in Thailand. Based on the results of a questionnaire and interview, he observed that the professionals urgently needed conversational skills at the advanced level and reading and writing at a lower level. He further reported that there is a fundamental divergence between the EAP program at university and the language requirements at the workplace. While the professional context requires engineers to demonstrate an outstanding speaking ability, the academic curriculum strongly emphasizes grammar, reading and writing.

Using a triangulated approach, Atai & Dashtestani (2013) appraised the stake-holders' attitudes in an EAP reading course towards the Internet in an Iranian context. Data analysis shows that although the majority of EAP instructors, computer engineering instructors and BS students endorse the application of the Internet in the program, the regular classroom activities profoundly suffer from a total absence of Internet-associated activities. A further investigation in the Iranian context was conducted by Atai & Shoja (2011) who analysed the needs of EAP students of computer engineering. The findings indicate that the students may invest more in general English than in EAP, with the results of a proficiency test revealing that they were not competent enough in general language proficiency.

Although these studies scrutinized the fundamental communicative skills in academic settings, the researchers, except in the two latter studies, relied on limited sources of data and instruments. The validity of needs analysis research findings should be enhanced by utilizing complementary instruments, especially, as Hyland (2006: 76) puts it, through observation and analysis of authentic spoken and written texts.

3. This study

English for occupational purposes (EOP) programs are currently developed for professionals at many industries in Iran including tourism, oil companies and energy plants. Also, EAP courses are incorporated in mainstream university curricula for all academic fields (Atai 2000, 2002). There is a pressing need in the EAP system for re-engineering the curricula and gearing the courses to the learners' needs.

Among the many faculties that have been opened in the last decade in Iran is the School of Railway Engineering (SRE), established in 1997 at Iran University of Science and Technology (IUST), Tehran, under the financial support of the Railways of the Islamic Republic of Iran. SRE offers its educational programs in three sub-disciplines: Railway Transportation Engineering, Railway Rolling Stock Engineering, and Railway Track and Structures Engineering. At present there are a total of over 600 graduates

and undergraduates. SRE has close scientific collaborations with the leading railway research and educational departments worldwide, including Dresden Technical University in Germany, Sheffield University in the UK, Beijing Jiaotong University in China, Dnepropetrovsky in Ukraine, Berlin Technical University in Germany, and Concordia University in Canada.

A second incentive for the study originated from the observation that SRE stands as the only railway school in the Middle East and it was originally planned to accommodate the students of the region. However, no needs analysis project has been conducted at this education site. Furthermore, the study is driven by the knowledge that although investigation on the language of workplace is rising, it is, according to Hewings (2002) and Swales (2000), far from sufficient in comparison with many other areas of applied linguistics.

Thus, the present study investigates the language needs of the students of RE and the compatibility between the downstream decisions and the students' needs. Three main research questions were then posed:

1. What are the academic language needs of undergraduate students of RE at university?

2. What are the target professional language needs of graduate students of RE?

3. Does the English course designed for undergraduate students of RE satisfy their needs at the workplace?

4. Method

4.1. *Participants*

Three groups of participants including policy makers, course-designers and practitioners took part in the study. More specifically, the sample included 123 undergraduate students of RE, three language teachers with PhD degrees from the Department of Foreign Languages, 15 content teachers (all PhD holders; all males) from the SRE, 42 railway engineers at workplace (all BSc holders; 12 females), the author of the textbook (a PhD holder of English Literature), the educational manager of the university (a PhD holder of RE), the head of the department of Foreign Languages, and the dean of SRE. Graduate railway engineers were selected from two companies: Consultant Engineers for the Development of Iran Railway (METRA) and Islamic Republic of Iran Railway (RAJA). Table 1 displays the demographic profile of the graduate railway engineers and Figure 1 illustrates brief profiles of the participants of the study.

		Sex	No.	Age	Job experience (in years)	Graduated from
Company	METRA	Male	15	25-30	1-7	IUST
		Female	3	24	1-3	IUST
	RAJA	Male	15	26-31	1-10	IUST
		Female	9	24-29	1-7	IUST

Table 1. Profile of participants at the workplace

It is essential to note that although the engineers at the workplace enjoyed a sizeable spectrum of experience, only six engineers were inexperienced. Almost 85 percent of the engineers had been well-socialized into the professional context; so experience does not play a jeopardizing role in the results of the study.

		Educational Level				Total
		1	2	3	4	
Sex	1	15	22	22	26	85
	2	5	8	10	15	38
	Total	20	30	32	41	123
	Age	18	19	20	21	

Educational level: 1 = freshman, 2 = sophomore, 3 = junior, 4 = senior
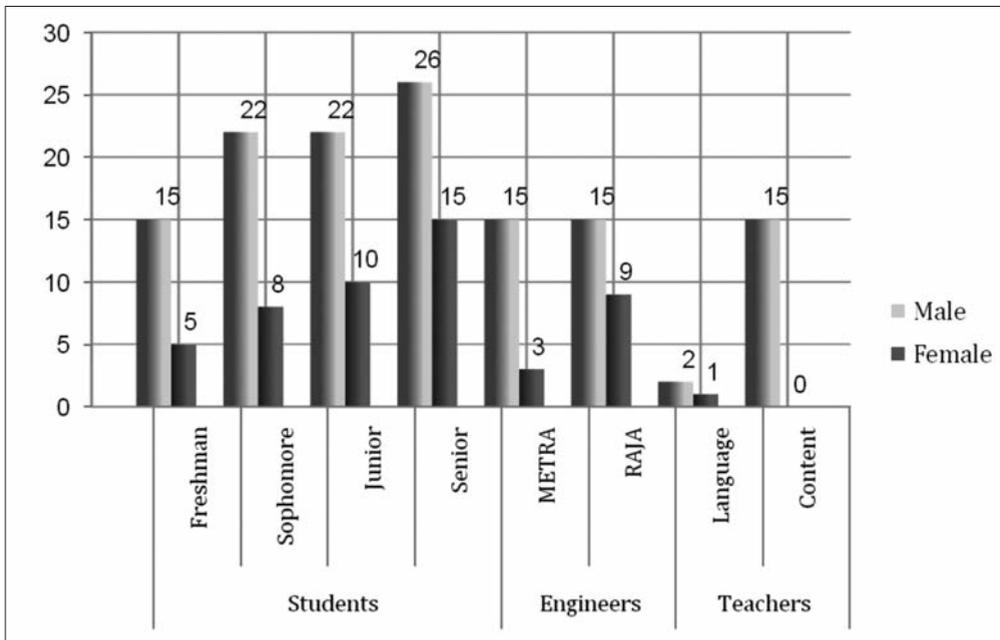
Table 2. Profile of undergraduate students

Figure 1. Different groups of participants

It should be pointed out that the purpose of the profiles presented in Tables 1-2 and Figure 1 is not to compare the elicited needs across sex, age, degree, experience or company. Rather, they demonstrate that a representative sample of the population was studied in this research. This is why BSc students from all levels completed the questionnaire.

4.2. *Instrumentation*

A number of instruments including observations, interviews, questionnaires and evaluation checklists were utilized to collect the required data.

In order to develop the questionnaires for each group of participants, we adopted

multiple models of needs analysis and considered motivation, perceptions, self-assessment, present situation analysis, target situation analysis as well as lacks and wants (Dudley-Evans & St John 1998; Hutchinson & Waters 1987; Hyland 2006; Jordan 1997; Robinson 1991). The items corresponding to each context were developed on the basis of direct observations of both academic and occupational situations along with the interviews with a sample of the participants. Prior to the study, the instruments were reviewed and commented on by two ESP specialists and consequently revised and refined by the researchers. It is worth noting that the questionnaires were prepared in Persian so as to avoid any possible misinterpretations.

To ensure psychometrics of the instruments, quantitative analyses were completed. Cronbach alpha analyses yielded reliability estimates of .95 and .98 for the questionnaires of undergraduates and graduates, respectively. Also, results of factor analysis verified the components of the questionnaires.

4.3. *Procedure*

The study was carried out in the second semester of the 2008-2009 Iranian academic year. Non-participant observations of the ESP classroom at SRE were completed followed by observations of workplace. During the ESP course, three one-and-a-half-hour sessions were randomly observed by the second researcher. It is worth mentioning that the initial two sessions were neglected intentionally for they were not taken seriously by the students and the course had not settled down. At the workplace, however, the researcher randomly observed the engineers carrying out their routine activities. The observations lasted 8 hours in total. The second researcher observed at least 100 engineers at different administrative positions carrying out a wide range of responsibilities from office work to manual tasks.

The questionnaires were also administered to the students at university and were filled out during their regular class time. The engineers completed questionnaires at the workplace when doing their routine tasks. Both groups were randomly selected from the SRE and different offices of METRA and RAJA.

Also, semi-structured interviews were conducted with 10 students who took the ESP course and with the other participants in their own offices. Each interview took 10 to 15 minutes. The researchers analysed both the final exam and the ESP textbook designed for the students of RE. Finally, the data were analysed using both descriptive and inferential statistics.

5. Results

The first research question investigated the present academic language needs of undergraduate students of RE. The results of questionnaires given to different groups of participants are shown below followed by the results of interviews and observations.

5.1. *Academic language needs of undergraduate students of RE*

Figure 2 displays the students' motivation for studying English for general purposes (EGP) and ESP courses at RE university.
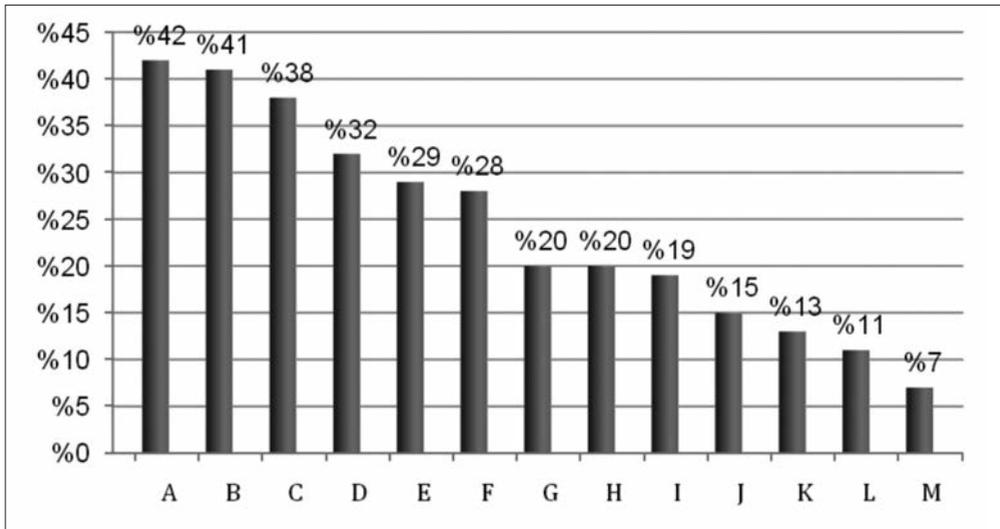
Key: (A) To speak English; (B) To succeed in a future job; (C) To keep myself up-to-date; (D) To read specific texts during my education at university; (E) To succeed at my university education; (F) To pass standard tests; (G) To watch and understand English movies and tapes; (H) To translate English into Persian; (I) To travel abroad; (J) To write in English; (K) Only to learn an international language; (L) To work with the computer; (M) To read English stories and magazines.

Figure 2. Students' motivation to learn English

As Figure 2 shows, the students are mainly motivated extrinsically by being concerned about their future jobs and oral communication, especially conversation. The second priority is given to succeeding in their discipline, Railway Engineering. In contrast, students did not express the need for literary skills of writing (15%) and reading (7%).

Students were also asked to express their ideas about their optimal preferred setting for learning English language.

1. Which setting do you prefer to learn English language in?
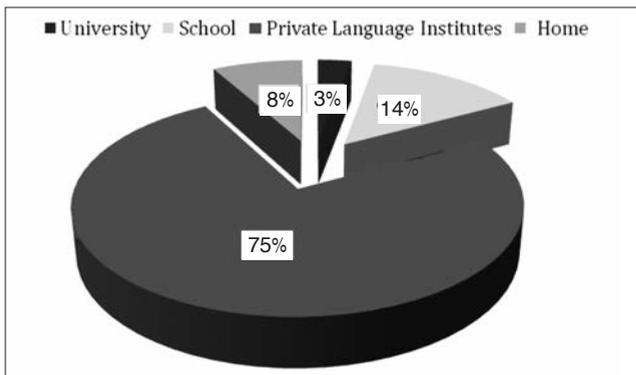a. Private language institutes   b. Schoolc.   Home (self-study)   d. University

Figure 3. Students' preferred setting for learning English

As Figure 3 reveals, the vast majority of the respondents preferred private English language institutes (75%). University and school are considered as the least preferred language learning environments.

Undergraduate RE students and their content teachers were asked about the importance of English language skills for undergraduate students. As Figure 4 depicts, students believe that they urgently need reading and conversational skills. Their content teachers, however, did not perceive speaking and listening (0.0%) as important language skills for undergraduate students but highlighted that students should develop their reading comprehension skill (86%).

2. Which English language skill(s) is (are) more important for undergraduate students?				
Skill	Speaking	Reading	Listening	Writing

Table 3. Undergraduate students' and content teachers' views on importance of skills
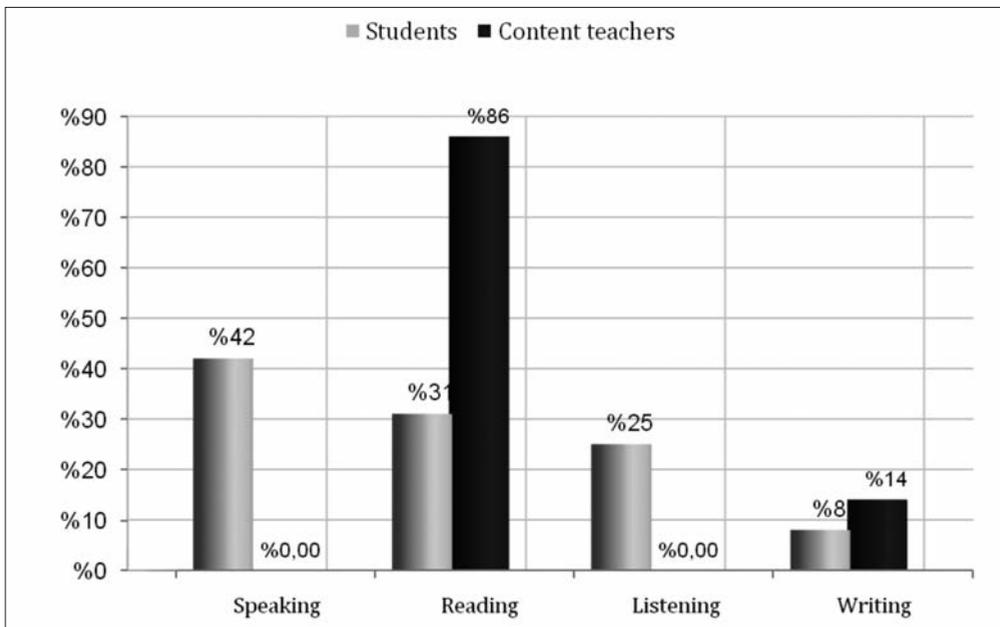

Figure 4. Students' and content teachers' opinions about the importance of different language skills for undergraduate students

In the subsequent questionnaire item, the students prioritized the tasks they need most in academic settings. Reading course books and journals (M=3.58) was considered much more important than reading sources on the Internet (M=3.0). The results of paired samples t-test ($\rho < .05$) verified the significance of the difference in their preferences.

On the basis of the mean ratings for the three writing tasks, i.e. 'projects' (M=3.35), 'papers' (M=3.34), and 'using the Internet' (M=2.51), pairwise comparison was carried out. The results show that writing 'projects' and 'papers', receiving equal importance, are considered significantly more important than 'writing on the Internet'.

The mean rates for the four speaking and listening tasks indicated that 'using the Internet' (M=2.87) is considered less important than the other tasks. The results of one-way repeated measures of ANOVA reveal that 'giving lectures' (M=3.54) and 'using the Internet' stand at two extreme poles of the spectrum, as the most and the least important tasks respectively. While 'listening to lectures and presentations' (M=3.23) along with 'participating in conversations' (M=3.26) are significantly more important than using the Internet ($\square$<.05), giving lectures (M=3.54) is considered significantly more important than the other three tasks. Both 'listening to lectures and presentations' and 'participating in conversations' were assessed important by the undergraduates.

To come up with a more vivid picture of the undergraduate RE students' current language abilities, they were asked to self-assess their language skills and subskills. They assessed themselves as good readers (M=2.47) and users of general vocabulary (M=2.58). Instead, they considered themselves poor writers, listeners and speakers. The results of one-way repeated measure of ANOVA indicated 'using general vocabulary' as the easiest task and 'using technical vocabulary' (M=1.77), 'writing' (M=1.77) and 'speaking' (M=1.75) as the most demanding tasks for the respondents. The mean difference between reading and other skills, except for using general vocabulary, was also significant ($\square$<.05). Students assessed themselves as average listeners (M=1.94) and grammar users (M=1.92).

Figure 5 demonstrates students' preferences for group and pair work. Students' preferences were in sharp contrast with the results of both classroom observations, where all classroom activities were implemented by instructors individually and textbook evaluation, which revealed that all assignments and activities were designed to be conducted individually.
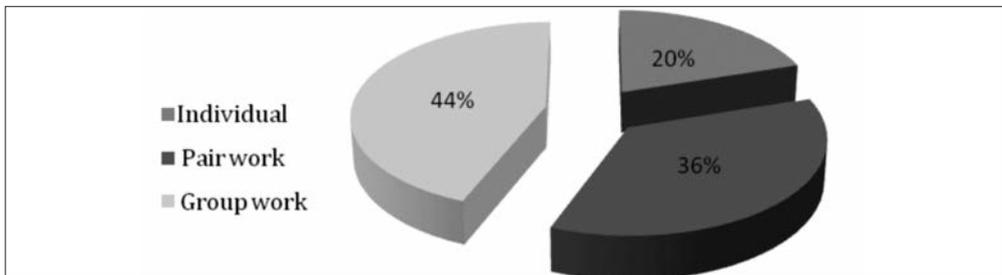

Figure 5. Students' preference for different types of classroom activities

The last item of the questionnaire elicited the students' and the content teachers' perceptions about syllabus, teachers, and the content of ESP courses at RE school. The figures in Table 4 reveal that both groups agreed on the following areas: allocation of more time to English classes, English as the medium of instruction in EAP classes, the importance of English in the university curriculum, the contribution of English to learning content courses, content knowledge of EAP teachers, and their expectations from EAP courses. The two groups of respondents, however, did not agree on the desired teacher for the EAP courses. Like their content teachers, almost half of the students preferred their content teachers to teach EAP programs.

	Content teachers			BSc students		
	TA	FA	D	TA	FA	D
More time should be allocated to English courses	100%	0.0%	0.0%	87%	12%	1%
The teacher should speak English in the class	67%	33%	0.0%	35%	42%	22%
English is the least important course at university	0.0%	0.0%	100%	3%	17%	79%
Learning English contributes to learning content courses	50%	50%	0.0%	60%	28%	12%
The number of sessions in English course is enough (once a week)	0.0%	33%	67%	19%	38%	32%
EAP course is expected to broaden both my English and content knowledge	67%	33%	0.0%	68%	24%	3%
Content teacher should teach English	17%	50%	33%	49%	35%	12%
EAP teacher should be a language teacher and have also content knowledge	50%	33%	17%	50%	40%	9%

Key: TA: Totally Agree   FA: Fairly Agree   D: Disagree

Table 4. Students' and content teachers' perceptions about syllabus, teacher, and content of ESP course at RE School

5.1.1. *Interviews*

To cross-check questionnaire data, interviews were conducted too. The author of the book believed that the course book was far from appropriate for the students because RE subsumes three sub-disciplines, so for each sub-discipline a separate course book should be developed. He also contended that the course book was developed by heavy reliance on his intuition and in line with the general guidelines set by The Iranian Center for Studying and Compiling University Books in Humanities (SAMT) with an almost exclusive focus on reading comprehension. Because of the wide gap between high school and undergraduate programs in terms of English instruction, the students lack the basic command of English in order to perform successfully in EAP classes; he suggested that the syllabus of English programs in high school mainstream education should be revisited so as to accommodate the students' shortcomings. With respect to the language / content teacher issue, the author also argued on the conflicting view that the language teacher is not responsible for the content; content-related questions should be directed to subject matter instructors. Altogether, he outlined a chaotic situation in the ESP programs under study.

Disagreements emerged between language and subject-matter instructors. Unlike language teachers who strongly believed that they should run the ESP courses, almost all (13 out of 15) content teachers maintained that they are satisfactorily qualified to handle ESP classes for the students of RE. Table 5 sums up language teachers' comments elicited through the interviews.

	Priority: L/ C?	Who should teach EAP?	Course book	Role of CT?	Methodology of GE and ESAP?
T1	Language	LT	Be totally changed	Consultant in developing the course book	No difference
T 2	Language	LT	Be totally changed	Consultant in developing the course book	No difference
T 3	Language	LT	Be totally changed	No role at all	No difference

Key: T: Teacher   L/C: language or content   GE: General English CT: content teachers   LT: language teacher

Table 5. Language teachers' responses to interview questions

In the interviews the students, in agreement with language teachers, believed that the course book is not appropriate, for the content is not geared to their interests and current needs. Nor do classroom activities take the students' needs into account. It was not surprising therefore that they expressed their deep dissatisfaction about the sterility of the mainstream EAP course which resulted in their strong preference for general language classes in private language institutes, verified by their answer to the second question posed in the questionnaire. A consequence of this situation was students' reluctance to follow the course. Regarding special classroom activities, they considered oral presentations as highly effective.

As for the results of interviews with other leading stakeholders, the dean of SRE and the head of department of foreign languages both expressed their discontent about the status of English language instruction in the undergraduate programs. They further pointed to the disappointing fact that the educational council of the university downgraded English language instruction by including it as an optional course in the syllabus of all faculties. But the dean of SRE took an extreme position and pointed to language teachers as the most likely culprit behind such an apparent failure and stated that they are not qualified to teach EAP. Displaying understandable reluctance, the educational manager of the university, a PhD holder of RE, finally participated in a short interview. Paradoxically enough, he pointed out that English is a vital tool for students, at least in their academic career, but he cast doubts about whether undergraduate students even need English or not. Nevertheless, the issue of "who should teach EAP" remained uncertain for the manager.

5.1.2. *Observation and course book evaluation*

Since classroom activities in the observed classes were highly tied up with the course book, the outcome of classroom observation and book evaluation are reported in a nutshell. As Table 6 illustrates, each unit in the course book contains three sections, beginning with a reading passage followed by some true/false, multiple-choice and fill-in-the-blank questions on language and content and, finally, five scrambled sentences

to be unscrambled into a coherent paragraph. The book starts with the history of RE followed by passages on topics that the students have already covered in their content courses.

Sections of each unit	Themes	Illustration
1st: reading passage	1st: history of RE	A few black & white photos
2nd: controlled practice	2nd: review of content courses	
3rd: scrambled sentences (cohesion & coherence)		

Table 6. Results of course-book evaluation

In practice, classroom observations indicated that a substantial portion of classroom activities, handled by a language teacher who employed both English and Persian as a medium of instruction, reflect the content of the book with no pair or group work. While disregarding the required reading subskills, the teachers and students focused on translation as the principal technique to foster the students' reading ability. All activities were carried out individually by the students as directed by the teacher. As a different task, students were required to read journal articles and present brief oral summaries. Sometimes students gave lectures followed by short discussions between the lecturer and students/teacher.

5.1.3. *Final exam*
Lastly, the final exam was analysed, as a representative reflection of classroom activities and textbook exercises. It comprised three major sections: a) a reading passage followed by some multiple-choice questions assessing the examinees' knowledge of vocabulary, a cloze test, and scrambled sentences to be reorganized in a coherent paragraph. The exam required more subject-matter knowledge on the side of testees than reading comprehension skills and strategies.

5.2. *Professional language needs of railway engineers at the workplace*
To answer the second question, the results of interview, questionnaire administration, and observation are reported in this section to disentangle target professional language needs of graduate students of RE.

The engineers were asked to rate the importance of the four language skills both at university and workplace. Their perceptions of the importance of different subskills to university education were compared with those for workplace through conducting paired samples t-test on means of ratings.

Four writing tasks were compared: writing projects at university (WProuni) and work (WProwo), writing papers at university (WPauni) and work (WPawo), personal writing at university (PWuni) and work (Pwo), and writing on the Internet at university (Winuni) and work (Winwo). The difference between WProuni (M=3.05) and WProwo (M=3.07) did not reveal a statistically significant value ($\square$<.05). That is to say, for engineers both WProwo and WProwo were equally important. But WPauni (M=3.75) was significantly considered more important than WPawo (M=3.12).

	At university				At work			
	VI	I	LI	NI	VI	I	LI	NI
Reading								
books and handouts	13	17	8	0	3	15	18	1
journals	13	19	6	1	9	16	10	1
on the net	9	15	13	2	17	16	4	0
Listening & speaking								
listening to lectures	8	9	19	3	13	14	9	0
conversations	14	13	10	5	15	11	7	2
giving lectures	10	13	13	2	20	9	6	1
using multimedia	6	18	12	1	10	16	8	1
Writing								
projects	5	25	7	0	11	18	5	1
papers	10	22	5	0	10	20	5	0
personal writing	1	16	15	4	6	13	10	5
on the net	2	13	11	10	4	12	11	7

Key: VI: very important;   I: important;   LI: less important;   NI: not important

Table 7. Graduate engineers' views on the importance of different tasks at university and workplace.

Likewise, the difference between PWuni (M=2.60) and PWo (M=2.78), although they were both graded less important than WProwo and WPauni, showed a significant value. The paired samples t-test also indicates that engineers regarded Winwo (M=2.66) an essential language skill at work. The difference between Winuni (M=2.46) and Winwo was significant ($\square$<.05). This is supported by results of observations of the workplace where all engineers, without exception, worked with computers.

Like writing, 'listening and speaking' was further analysed in terms of four major tasks: listening to lectures at university (LiLuni) and work (LiLwo), participating in conversations at university (PaCuni) and work (PaCwo), giving lectures at university (GiLuni) and work (GiLwo), and using multimedia at university (Muni) and work (Muwo). The results of paired samples t-test confirmed that LiLwo (M=3.14) is of utmost importance for the engineers. Likewise, the respondents felt that what they really need, in comparison with PaCuni (M=2.98), is PaCwo (M=3.24). Again, the difference between GiLuni (M=2.96) and GiLwo (M=3.29) was statistically significant. Muni (M=2.94) also received less importance than Muwo (3.03); the difference was significant at ρ <.05.

Three leading reading tasks were specified and included in the questionnaire: reading books and handouts at university (Reboun) and work (Rebowo), reading journals at university (Rejoun) and work (Rejowo), and reading on the Internet at university (Rintuni) and work (Rintwo). While the results show that engineers rated

the importance of Reboun (M=3.26) and Rejoun (M=3.23) as significantly higher than Rebowo (M= 2.68) and Rejowo (M=2.03), respectively, they perceived Rintwo (M=3.30) as significantly more important than Rintuni (M=2.94).

The data about the participants' workplace needs were analysed through repeated one-way ANOVA measures in order to examine the importance of different tasks in each skill. The results of pairwise comparisons show that the difference between reading journals (M=3.00) and reading books (M=2.71) is significant at .05. However, reading on the Internet (M=3.32) was perceived as more important than reading journals.

To the engineers, the least important listening and speaking task was using multimedia (M=3.08). Although the other three tasks were perceived as equally important, giving lectures (M=3.30) significantly received the top priority followed by participating in conversation (M=3.25) and listening to lectures (M=3.16).

The first two tasks of writing projects and papers, both with a mean of 3.07 were assessed as significantly more important than personal writing and writing on the Internet ($\square$<.05). But personal writing (M=2.62) was rated as slightly less important than writing on the Internet (M=2.67).

Similarly, the perceptions of engineers at the workplace regarding the syllabus, teachers and content of EAP courses at university were explored. The results are presented in Table 8 below.

	What is your idea about the GE and EAP courses offered at the university?	TA	FA	D
A	More time should be allocated to English courses	88%	5%	0%
B	ESP textbook should contain materials about my own discipline	76%	14%	2%
C	The teacher should speak English in the class	55%	24%	2%
D	English is the least important course at university	14%	36%	43%
E	Learning English contributes to learning my content courses	76%	14%	0%
F	The number of sessions in English course is enough (once a week)	2%	16%	74%
G	EAP course is expected to broaden both my English and content knowledge	71%	19%	2%
H	Content teacher should teach English	29%	50%	12%
I	EAP teacher should be a language teacher and have also content knowledge	31%	50%	9%

Key: TA: Totally Agree   FA: Fairly Agree   D: Disagree

Table 8*.* Engineers' perceptions of syllabus, teachers, and content of EAP course at university

The engineers' appraisal of English courses held at the RE University is in complete agreement with the students' ideas, which confirms the importance of English both in their career and university education. Not surprisingly, a closer look at Table 8 also indicates that the engineers shared the same conceptualization of ESP courses with students and content teachers at university; they think of ESP courses as content-based instruction. In what follows, engineers' responses to questionnaire items are presented.

Which skills do you think may play a significant role in your professional success?

1. Reading 67.5 %   2. Writing 10%   3. Listening 17.5%   4. Speaking 40%

 (Note: Since the participants were required to choose more than one skill, the total percentage exceeds 100%)

While suffering from an inadequate command of reading, engineers also noted the importance of speaking as the second important language skill to their job success.

To what extent do you think that ESP classes you took at university satisfy your occupational language needs at work?
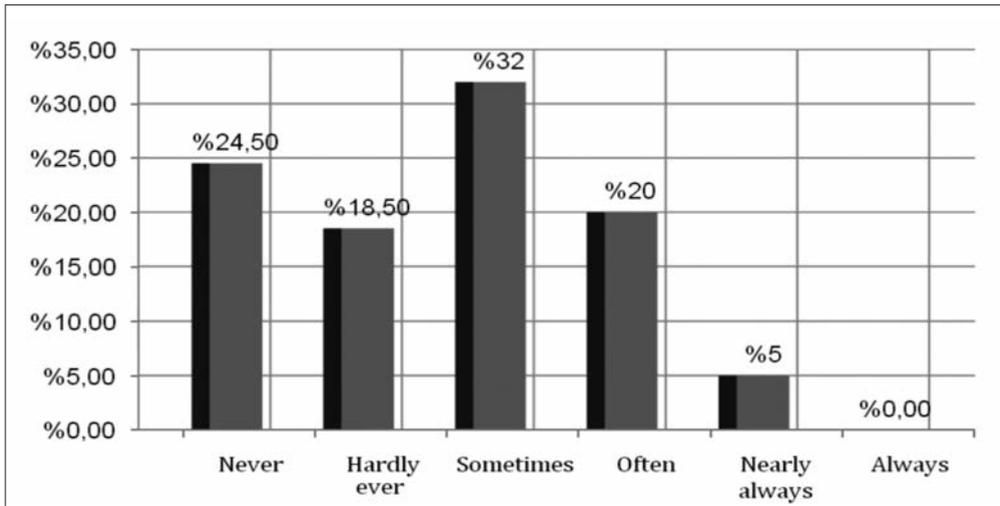

Figure 6. Engineers' perceptions of the effectiveness of EAP courses held at university for the workplace

Engineers cast doubts about the adequacy and efficiency of ESP courses offered at university for the working environment.
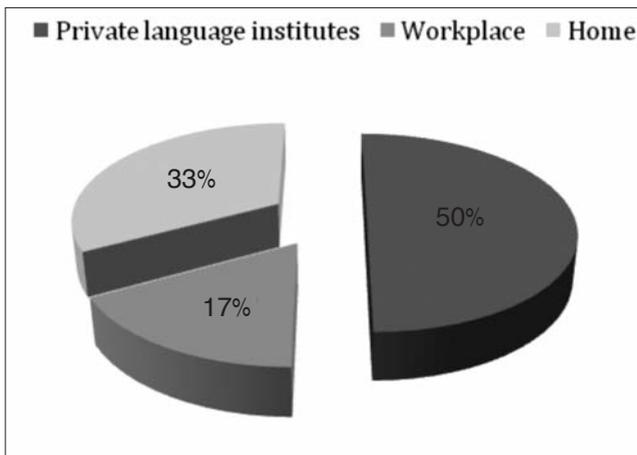

Figure 7. Engineers' preferred setting for learning English

If you find ESP courses at university less than satisfactory, what options and settings do you prefer for meeting your occupational language needs?

Similar to students, most engineers seek different ways to compensate for their poor command of English language, mainly through joining private language institutes. Engineers were also asked, on the basis of their extensive contact with English at the workplace, to identify the problematic areas in language use. Most engineers (75%) perceived serious problems with their oral skills (listening and speaking). They seemed to have overestimated their ability to use general vocabulary, reading and grammar, however.

As for the last question, informed by principles of critical needs analysis, the participants were asked whether they had ever been consulted concerning designing, evaluating and renewing ESP courses at the university. The engineers' unanimous answer was negative.

The results of the interviews with engineers at workplace supported the questionnaire data and confirmed that their immediate needs are reading and writing. They also voiced their major difficulties including their deficient English skill in preparing reports, especially under pressure. Job promotion was reported to be another major concern for the participants, and their inadequate English proficiency posed a serious barrier. All engineers unanimously agreed that the low English language proficiency of engineers, among many other variables, may prove a great hindrance for the development of RE in Iran.

The non-participant observation at the workplace revealed that what posed a serious problem to most engineers was grammar and vocabulary because, while working with computers, most of them were consulting either grammar books or bilingual dictionaries. Further data came from observing some authentic telephone conversations between Iranian engineers and their foreign partners while arranging to sign contracts. Observations supported the need for conversational skills. No Iranian engineer participating in a workshop conducted by a Chinese engineer managed to communicate effectively with the instructor, so their communication was mediated by an English language interpreter.

6. Discussion and conclusion

This triangulated research aimed to provide a comprehensive account of academic English language needs of Iranian undergraduate students of RE along with professional English language needs of graduate engineers at the workplace. While content teachers and the author of the book believed that undergraduate students need only reading as the most important language skill, the students and graduate engineers perceived an urgent need for reading and speaking skills. More specifically, they were more concerned with reading course books and journals, writing projects and papers, and giving lectures. Since Iranian EAP students have considerable contact with audiovisual sources, as Farhady (1996) argues, giving reading the top priority should be revisited through thorough needs analysis research.

The disagreement between the students and their content teachers may be interpreted in the light of the students' educational background. Since these students

exit from the traditional reading-based pedagogy in high schools, they lack the required conversational skills to communicate effectively in an academic environment, so they expect EAP programs to compensate for their inadequate communicative ability. This means that, regardless of the content / skill focus of the course, the students are seeking to fulfill their own wants and objectives. The strong link between their educational background and the present needs is manifested more explicitly in the participants' appraisal of their own language ability levels. Both undergraduate and graduate students confidently rated themselves good readers and vocabulary users but poor interlocutors. Hence, as Hutchinson & Waters (1987) argue, language needs should be distinguished from learning needs. Also, learners may need some specific language skills in their target environments (Atai & Nazari 2011).

Moreover, in response to the questions regarding the participants' ideas about general English (GE) and EAP courses at university, all participants, including content teachers, expected these courses to be renewed and geared to the students' needs. They maintained that students' entry behaviour is far from sufficient to survive in EAP programs. Atai & Tahririan (2003) found that the students' entry behaviour and GE level play a facilitative role in undergraduates' performance in EAP programs. Accordingly, wide angle ESP (Widdowson 1983), analogous with Dudley-Evans & St John's (1998) English for General Academic Purposes (EGAP), should lay the foundation for a narrow angle EAP course. It is therefore suggested that further GE or pre-EAP courses may narrow the gap between the undergraduates' high-school exit behaviour and their entry behaviour to university EAP programs. Although compulsory, English is taught in the first year of academic courses. Therefore, as Dudley-Evans & John (1998) argue, students are totally demotivated when they are terminating the program.

Furthermore, the materials, especially the course book and the methodology to handle EAP classes under study, seemed to result in counterproductive outcomes, as verified through observations and interviews. In line with Harwood's (2005) warning to teachers that it is a misconception to assume that ESP books are the product of a careful collaboration between theoreticians and practitioners, in the context under study the textbook for RE students represents the author's intuitions and the strict criteria set by the Iranian textbook compilation organization (SAMT). In addition, given the assumption that an EAP course should engage the learners both in content and language, the textbook for SRE students covered topics that were excessively familiar to the students, and this seems to have rendered the course less stimulating, as reported by some students in the interviews.

With regard to the assets and qualifications of the EAP instructors, the results of interviews indicate that content instructors and language teachers disagree and sometimes contradict each other. While the instructors in the English department think they are qualified to implement the ESP courses, content teachers insist on their higher qualifications to offer the courses. Apparently, this seemingly ever-growing dispute stems from some long-lasting misconceptions and malfunctions. Content teachers seemed to interpret EAP instruction as teaching subject matter in English while the English language teachers found EAP instruction as teaching English

through subject matter. This gives clues to the urgency of educating and training English language teachers for teaching EAP courses.

Another facet which warrants close attention finds its roots in the current inferior status of English in the academic curriculum, as discussed by both the authorities and instructors. In fact, the stakeholders did not consider ESP instruction as essential to the students' current and future needs. This incongruity between academic instruction and occupational needs is in line with the previous findings in the Iranian context (Atai & Tahririan 2003) and in the European context (Dominguez & Rokowski 2005). Dudley-Evans & St John (1998) further challenge such inconsistencies by introducing the notion of "delayed needs" which appear in future work. Engineers at workplace complained about their impaired competence in listening and speaking.

Another illuminating insight gained from the results of this study are the numerous overlapping needs the undergraduates and the engineers share at workplace, mainly for oral communication. The findings verify the results reported by Dominguez & Rokowski (2005) too.

As for the distribution of power relationships and sources of policy-making, the respondents perceived scattered entities in different layers of the system. Regardless of what the students may indeed need, policy-makers and EAP boards operationalize the programs according to the educational documents. Given such drastic misconceptions about the nature of the EAP curriculum, content teachers strongly insisted on their rights to teach English. English language teachers tended to implement the strict methodologies of general English instruction in EAP courses. Undergraduate RE students as well as RE engineers seemed to pursue alternatives to realize their wants and shortcomings through joining private language institutes.

Several direct implications may arise from the findings of this study. As a fundamental and preliminary step, close cooperation and effective collaboration should be established among the different layers of the system, including educational authorities at the university and administrators at the workplace, subject specialists, materials developers, language teachers, and students. This kind of cooperation is an expansion of narrow-sense unity, between language and content teachers and students, as already stressed in the literature (Hyland 2006).

Also, the EAP courses are incorporated in the undergraduate RE curriculum. This implies that they should serve as the launch pad to meet the students' needs both at the workplace and in graduate programs. A thorough change, therefore, should be implemented so as to embrace those skills students encounter at the workplace, especially oral communication skills. Therefore, to prepare students for both higher education and future work, students need more than the current two-credit English course. More stimulating activities can be devised to simulate authentic tasks engineers undertake at the workplace.

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