

Specifying English Needs of Iranian EFL Physics Students

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Abstract

Designing a curriculum which will match the needs of the learners and help them meet the goals of a language course can best be achieved by starting with a comprehensive needs analysis. This study is an attempt to discover English language needs of physics students and graduates in Iran. A mixed method design including questionnaire and semi-structured interview were used in the study. Two versions of questionnaires were administered at University of Isfahan and Islamic Azad University, Isfahan (Khorasgan) branch to 206 randomly selected MA students and 17 related university instructors from faculty of physics in order to determine which of the four English language skills were most essential to the academic needs of students. In addition, the study looked at what academic sub-skills students are expected to need in order to complete their studies successfully. The results revealed that reading skill has been rated as the most important skill. The importance of English skills according to the priorities for the students was as follows: Reading, Technical words, General vocabulary, Writing, Speaking, Listening, Pronunciation, and Grammar. Furthermore, graduate students indicated a greater need for writing abstracts and, giving presentations in seminars. Generally, the study indicated that the present practice of EAP in the curriculum is not consistent with the perceived needs of students. It is hoped that the findings of this study would shed light on syllabus design and curriculum development for university programs in Iran.

Keywords: English for Academic Purpose, English for Specific Purpose, Needs Analysis, Physics Students and Graduates

INTRODUCTION

ESP courses teach specific skills and components of language which help students to function effectively and efficiently in their disciplines of study, professions, and workplaces. According to Basturkmen (2010), there are three branches in the area of ESP teaching: English for Academic Purpose, English for Professional Purposes, and English for Occupational Purposes. EAP is divided to English for General Academic Purpose, and English for Specific Academic Purpose such as “English for academic writing” and

“English for law studies” respectively. English for Professional Purposes and English for Occupational Purposes are also divided into both general and specific purposes.

The content of ESP courses is determined by identification of these needs by course developers. This process is called need analysis (NA). Over the time need analysis has become increasingly sophisticated (Mayo, 2000; Tajino, James, & Kijima, 2005). West (1997) reports the expanding concept of NA by use of the metaphor of a journey. Earlier only necessities or objective needs or target situation analysis were considered in NA. Target situation analysis aims to determine priorities, such as which skills (reading, writing, listening, speaking) and which situations or tasks are more or less important in the destination of learner’s journey.

However, later it was expanded to lacks or the gap between what the learner needs to know and the learner’s present language proficiency, called deficiency analysis or present situation analysis, which is the point of departure for the language learning journey. In time, strategy analysis, the means of travel (the preferred approaches and methods) was added in NA. And as the last item added to NA, means analysis contains identification of the constraints and opportunities in the teaching situation. It includes gathering information on the classroom culture, learner factors, teacher profile, and the status of language learning in the organization, which represents the ESP journey in general (Dudley-Evan and St John, 1998). These items might be present in other NA resources as learner factor analysis and teaching context analysis.

STATEMENT OF THE PROBLEM

Based on current curriculum of education, undergraduate physics students pass one three-credit course in general English and one two-credit course in specific English, and there is no English course at graduate level. With reference to the class time, only one session (two hours) a week is allocated to the EAP classes in the curriculum; therefore, it provides little time for students to be exposed to English input.

In interviews with undergraduate students, they claimed their English textbooks are insufficient from several aspects. First, lack of some general translation skills, because sometimes they have translation projects which are assigned by their professors as part of their final scores. Second, they emphasized the importance of academic reading comprehension skills and knowledge of vocabulary in their graduate entrance exam which are not covered or guided enough in their textbooks. The number of students participating in private higher education institutes to compensate for these missed syllabi is a case in point. Third, some ESP instructors prefer to choose their own handouts to teach in ESP classes rather than SAMT book, because they believe that the official book is not well-prepared, and students think that neither SAMT book nor handouts are useful and comprehensive. Graduate students also have the same problems; In addition, they said at their level the translation even becomes more critical. Students at this level are expected to search and study new scholarly articles related to their thesis, and sometimes they, also, aim to present their articles in international conferences which needs a great deal of speaking proficiency too. One of university instructors claimed that sometimes

what students present in their reports not only does not transfer the exact scientific value, but also in some cases the truth value has changed to some extent. That is why the PhD students need to submit a TOLIMO or an IELTS score before their graduation and in their interview before being accepted in PhD program having a satisfactory language proficiency score counts as extra points for them.

This study attempts to provide some useful information to design more effective ESP course syllabus. To do so, physics students' needs of English skills and different components of language were evaluated, and it can help them and their instructors to improve their problematic skills, sub-skills, and as a result the quality of EAP and ESP courses at undergraduate level. The findings have implications for revising the current ESP courses for physics students. Both content professors who want to design ESP courses for their own students, and national curriculum designers who want to evaluate and revise the current books can benefit from the results of this study.

RESEARCH QUESTIONS

This study attempts to investigate the needs and views of physics graduate and undergraduate students. The research questions are:

1. What are the specific English language needs of Iranian physics students and graduates?
2. What language skills do they need to develop?
3. What language skills are more needed for female physics students and which ones are more needed for male physics students?
4. Are there any differences between students' and teachers' attitudes towards the importance of ESP in physics major?

LITERATURE REVIEW

In this part this study talks about the related literature of this study.

What is English for Specific Purposes?

English for Specific Purposes (ESP) is a branch of English Language Teaching (ELT) which in turn is divided into two main branches of English for Academic Purposes (EAP) such as Medicine, Engineering, Theology, etc. and English for Occupational Purposes (EOP) such as English for secretaries, technicians, etc. Considering the developments in science and technology and the appearance of many different majors inside each course like medicine, engineering, theology, etc. makes EAP a special Language in each course and their materials should be compiled in accordance with that course.

Basturkmen (2010) illustrates the divide between teaching English for Academic Purposes (EAP), teaching English for Professional Purposes (EPP), and teaching English for Occupational Purposes (EOP). ESP can be classroom-based or on-site workplace-based.

Compilation of ESP textbooks for any major and the ability to present and teach them in a classroom requires familiarity with issues of that major, whereas such a familiarity is not necessarily important for compiling general English textbooks. Therefore, it is said that the author and the teacher of ESP textbooks must have at least a good proficiency not only in English language, but also with presented materials (Basturkmen, 2010). According to Robinson (1991, p. 1) what is considered specific about ESP in a given location in the world may not be considered the same elsewhere. Deutch (2003) also points out that Students' requirements in different settings are varied and the analysis of requirements can be influential if the academic language needs are exactly defined and seek ultimate specificity within the specific target use. Thus, it is impossible to provide a certain definition for ESP which could be constant anywhere.

English for Academic Purposes (EAP)

EAP sounds to have an extensive range because the contents are considered for different courses of study. In other words, it is more specific compared to ESP because it focuses on the specific disciplines; it includes skills required by students in order to prepare them for their future study needs. Basic skills in EAP are academic reading as the primary skill, writing, listening and speaking as less and less demanded skills (Eslami Rasekh & Simin).

EAP can be defined as "the portion of the curriculum which prepares students for gainful involvement in study situations ranging from low-level to sophisticated language needs in technical fields" (Anthony 1997, p. 56). EAP courses focus on meeting the demand for students by providing specific language training and skills through content-based instruction (CBI) activities in order to enhance basic skills development in particular reading skill (Eslami Rasekh & Simin). According to Anthony (1997), most EAP classes consistently expose students to sufficient training in reading, writing, speaking and listening. From the trainings, then students are assumed to accomplish their specific professional functions that are required and necessary in their field of study or work.

Providing EAP University Textbooks

When the goal for each course of education is clear enough, then providing textbooks must be in line with those goals considering both contents and methods of compiling. One of the important factors which should be taken into account prior to providing ESP textbooks is students' background knowledge of English.

Needs

No unanimous consensus can be found in the literature of the field with respect to naming, conceptualizing, defining, and interpreting needs, which might thus lead to different approaches to needs analysis. The needs are either objective or subjective; the latter is beyond the established procedures of analysis and hence is excluded from the NA studies.

Needs Analysis

Needs analysis should be a must for any kind of education. Brown (2001, p. 35) defines needs analysis as “the activities involved in gathering information that will serve as the basis for developing a curriculum that will meet the learning needs of a particular group of students”. Belcher (2006, cited in Liu, Change, Yang, & Sun, 2011) argues that not only does this learner-centred perspective aid teachers and course designers to discern what learners' wants and wishes are, but it also gives learners a voice in choosing the content, thereby emboldening them to invest and participate more in the course.

Needs Analysis in ESP

Needs assessment is required means of conducting research before outlining and determining Lessons/materials/curriculum and it aids draw a profile of learners/classes in order to decide and prioritize the needs for which learners necessitate English (L2). (Richards et al., 1992, as cited in Jordan, 1997, P.20).

Benesch (1996) believes that we need to go beyond the descriptive approach to needs analysis and consider critical needs analysis. Critical needs analysis acknowledges the existing demands but considers the target situation demands as a site of possible reform. Benesch believes that needs analysis has so far surrendered to the domination of the institutes and authorities and suggests that we need to consider needs analysis as a political and subjective process and EAP classrooms as a site of struggle. Critical needs analysis assumes that institutions are hierarchical and those at the bottom are entitled to more power than they have and therefore areas where greater equality might be achieved should be explored.

The target situation needs analysis approach

The term Target Situation Analysis (TSA) was, in fact, first used by Chambers in his 1980 article in which he tried to clarify the confusion of terminology. According to Chambers (1980) early instruments for establishing needs is by investigating the target situation for which learners were being prepared: the language need of the target situation is the goal of the ESP course. Thus needs analysis should be concerned with the establishment of communicative needs and their realizations, resulting from an analysis of the communication in the target situation, what is referred to as "target situation analysis" (Chambers 1980, p. 25).

Methodology in Needs Analysis

Long (2005) proposes the following major sources for the identification of learners' English needs considering both insiders and outsiders: published and unpublished literature, learners, applied linguists, domain experts, and triangulated sources. The credibility of the research increases radically when the researcher compares the different sets and sources of data. Triangulation with different methods, investigators or theories, and sometimes a mix of thereof are also possible, and for sure conflicting triangulated findings urge more investigation on the topic. Long (2005) argues pilot-testing NA

materials is extremely important, particularly in the case of questionnaire items, to avoid irrelevant questions, double-barreled questions, overly complex and technical wording, leading questions, ambiguity, abstractness, and sensitive or threatening questions.

Researches on ESP Courses around the World

Akyela and Ozeka (2010) carried out a needs analysis in an English medium university in Turkey. In this study the focus was basically on the importance and effective use of learning strategies related to four basic language skills in second or foreign language learning. Participants of the study included 2328 students in the 1st, 2nd, 3rd and 4th years of six different departments of five undergraduate and one graduate schools of the university, and 125 lecturers who were randomly selected from different departments in those schools. The results of the investigation indicated the need for encouragement of the students to use effective learning strategies in an English language education program of the Prep School. The results indicated no discrimination between teaching or testing in teaching materials and methods. This research study was a good example of needs analysis research using different methods of data analysis along with a large number of participants.

Wozniak (2010) set out needs analysis that gives a detailed account of an analysis carried out at the French National Skiing and Mountaineering School. The aim was to assess the language needs of French mountain guides, the study started from August 2008 and continued to June 2009. The research consisted of three stages for the process of data gathering: first, three unstructured sixty-minute interviews which were. Second, a questionnaire with 37 questions and four parts: personal details (age, gender, mother tongue, and foreign languages), language biography (language training and travels). Also an open-ended question allowed candidates to contribute personal comments they considered relevant. Finally, information was gathered concerning novice guides' actual level of proficiency on graduation and the threshold of their careers (nonparticipant observation of the final exam). The results showed that mountain guiding was a constantly evolving occupation, and many of guides believed that the main issue was improving communication skills not technical ones.

Liu et al. (2011) investigated the English needs of college students both in the settings of English for General Purposes (EGP) and English for Specific/Academic Purposes. Adopting Hutchinson and Waters (1987) model of needs, they administered a questionnaire to 972 EFL college students from six different universities in Taiwan to identify their necessities, lacks, and wants in different language skills. Their results indicated that students had different views of these concepts in the language skills taught, and that there were differences between students' perceived needs and the course they took. In other words, as their results indicated "what students need is not always what they lack" (p. 276).

Research on ESP Courses in Iran

The focus of the study conducted by Rasekh and Simin (2011) is to identify the communication needs of students to prepare them to enter independent study and research in future academic or professional career through English. However, 79% of them said that the English programmer is inadequate to prepare them for the study needs involved, especially in comprehending EAP materials leave alone writing them.. The study also provided useful information on learning strategies preferred by students in different skills and sub-skills.

In a large scale study, including 681 students along with 168 subject-specific instructors and 6 English instructors, Mazdayasna and Tahririan (2008) conducted a mixed-method study to investigate the foreign language learning needs of undergraduate medical sciences students. Surprisingly, they found that all the teachers “believed in the necessity of change in their students' English education” (p. 281). Moreover, the findings of the study revealed that many students were dissatisfied with the textbooks adopted, their instructors' teaching methodology, assessment method, and also with the number of students in each EAP class. They found that most of the ESP teachers in Iran believed that students greatly need to develop their listening and speaking skills for participating in academic discussion, speaking at seminars, meetings and presentations” (p. 282).

In another study, Atai and Nazari (2011) adopted a triangulated approach involving questionnaire, test, interview and observation to investigate the target and present reading comprehension needs of Health Information Management (HIM) students. The results showed that “both EAP teachers and undergraduate students perceived problems with ‘general understanding of the texts’, ‘reading speed’, ‘knowledge of HIM technical vocabularies’, ‘knowledge of general vocabularies’, ‘knowledge of sentence structure’, and understanding the relationship between sentences” (P. 36).

As a large-scale nation-wide triangulated project by Soodmand Afshar and Movassagh (2016) aimed at investigating whether the perception of needs varied significantly from the viewpoints of EAP teachers, EAP students and syllabus designers. The results revealed the stakeholders involved had significantly different perceptions of needs. Reading comprehension, however, was perceived by all to be the main need of EAP students. Most of students believed that they needed to develop their listening skills to listen to lectures, classroom presentations, instructions, and conversations with other students and colleagues. On the contrary, teachers did not perceive listening as an important need. Nearly 47 percent of teachers disagreed that students needed English to question and answer in English in classroom discussions and seminars, whereas most of the students considered speaking skill important for such diverse purposes as taking part in academic discussions, lecturing in meetings, taking part in question and answer sessions in class while they were doing their undergraduate courses and later in seminars and conferences they would attend. With regard to writing skills, about half of students either agreed or strongly agreed that they needed English to take notes from lectures and books, and to write something to present in the form of a conference. Nevertheless, only

a small number of teachers believed their students needed English for the different writing purposes just mentioned.

Another study by Eslami Rasekh and Simin (2011) is related to students of Tourism Planning and Management. In this study sixty MA students were asked to present their opinions concerning their preferences for the target proficiency needs, their present level of proficiency, and their attitude towards the role of English in their careers. The findings of data analysis revealed that homogeneity was the most important obstacle for any efforts in monitoring the course; neither the level of proficiency nor their attitude was found to enjoy any acceptable degree of homogeneity. It is suggested that, in addition to measures to be taken before admission of students to the program of study such as giving greater significance to the TEFL section of the entrance exam and setting up proficiency requirements, modifications to the course design including choice of self-study reading materials, limited use of L1, and choosing easy to do tasks for the weak majority are suggested.

Eslami (2010) reported the perception that EAP students and instructors have of the problematic areas in EAP programs in Iran. A total of 693 EAP students majoring in different academic disciplines and 37 instructors participated in this study. The data incorporated respondents' perception of the importance of challenging areas in EAP programs. The results show discrepancy between the perceptions of EAP learners in different academic fields and between learners and instructors. The results of the study hold the view that the students need to improve their general proficiency in English. Students' low level of language proficiency was believed to be more problematic by students in humanities and engineering than medicine. Inadequate vocabulary knowledge, slow reading pace, poor listening, speaking, writing and reading comprehension, and boring classes were among problematic areas for students.

Another NA study was designed by Dehghan (2007) aiming at finding language needs of electrical engineering and computer engineering undergraduate students in their carrier environment and academic setting. The participants of this study were 100 male and 58 female undergraduate students, 27 male and 3 female instructor, and 56 male and 19 female graduates. For data collection, questionnaire was used as the main source but to gather basic general information, 15 students were interviewed about 4 skills regarding their university studies and their future job environment. The findings stated that there was a significant difference between the perceptions of the undergraduate students, instructors, and college graduates regarding their language needs. It meant that the participants believed that different language needs were important for the students' success.

Moreover, Atai and Tahririan (2003) conducted a research study aiming at assessing the status of ESP in the Iranian Higher Education System. Participants of the study were 823 sophomores (males and females) who were enrolled in the corresponding EAP courses in the spring semester of the 1998-1999 academic years. The results revealed that General English plays an influential role for success in EAP instruction. The Iranian EAP learners do not generally enjoy expected GEP levels prior to enrolment in EAP/ESP

courses. The researchers seriously invited foreign language curriculum planners to diagnose mistakes in the curriculum and decide on appropriate remedial procedures.

METHOD

In this part the methodology of this paper is elaborated

Preliminaries

The main reason for starting the present study, besides the researcher's intention, was the great importance and attention about need analysis and ESP in science, especially for Iranian physics subject students.

There is much consensus among second and foreign language researchers that learners have different needs based upon which they learn a language for different purposes. Therefore, the practice of language teaching should be meticulously geared to students' needs and purposes. Strevens (1977) believes ESP should be employed where the context requires specific teaching for particular jobs, subjects, or purposes. As a result, ESP courses should be carefully tailored to the specific needs of the learners (Widdowson, 1987).

NA is considered as a basic principal of ESP (Robinson, 1991) and most of the information on NA initially came from ESP. All these uses of NA refer to the fact that NA can be used for a range of purposes. It can be helpful in determining whether a program should be implemented by finding out if it matches the goals and objectives of the learners for learning a language and at the same time used as part of a program can help in improving various components of the program and making these more oriented to the needs of the learners.

However, curriculum developers have entirely abandoned needs analysis and developed courses based on their own intuitions (Atai & Tahririan, 2003). There is scarcity of research on academic English language needs of students in the Iranian context (Atai & Shoja, 2011), and as far as the present researcher is concerned, no serious study has been undertaken to assess academic English language needs of physics students.

Participants

A total number of 206 Iranian physics students who have already passed their ESP, and 17 related university instructors participated in the study. In order to have representative view, students and instructors were chosen randomly from 2 different universities in Isfahan, Iran: 1) University of Isfahan, and 2) Islamic Azad University, Isfahan (Khorasgan) Branch.

The reason for choosing physics students for this study is that appropriate English knowledge in their field of study is necessary for them in order to be able to meet their academic needs for further educational and also to facilitate their access to international publications in this subject area.

The total number of participants answered the questionnaires were 206 students, based on gender, (118) male and (88) female; between 18 to 50 years old.

Instruments

Three kinds of instruments were run in this study: 1) pilot study, 2) needs analysis questionnaires, and 3) semi-structured interviews.

Semi-structured Interviews and pilot study

The semi-structured interviews with a sample of domain experts and in-service learners provided initial findings for designing questionnaire items. These instruments were piloted with a sample population and modified as needed, and, finally the data obtained through the administration of questionnaires was statistically analyzed.

Needs Analysis Questionnaires

Student's questionnaire comprises of four different parts, the first part deals with background information of the participants (age, gender, and education), and the second part consists of eight questions about various aspects of the important of ESP in physics syllabus and curriculum. The first question consists of one category which had 9 sub-questions about the effect of English skills and other components on physics major problem solving from students' point of views, it was designed to measure students' attitudes on a four-point Likert scale. On the positive side of the Likert scale was very important, important, rather important and not important.

The second question includes 4 different sub-questions, namely, evaluations of physics students' problems in learning English, role of reading, listening, speaking, and writing skill on physics ESP books. The third question was about students ideas towards need for change in physics subject curriculum, and fourth part was an open ended question asking students to write down any comments they have related to the physics major need analysis. In this way, the questionnaire provided both qualitative and quantitative data. On the other hand, the teacher's questionnaire consists of two parts. The first part includes nine questions about the role of English skills and other components from the teachers' perspective. It is similar with the first part of questionnaire given to the students. The second part of the questionnaire consists of an open-ended question. It was administered to 17 teachers who teach either English or content courses to physics students.

Procedure

This study was based on the mixed-method approach and it was a qualitative and quantitative research using both interview (before preparing the questionnaires) and two questionnaires. Semi-structured interviews with a sample of domain experts and in-service learners provided initial findings for designing questionnaire items. These instruments were piloted with a sample population and modified as needed, and, finally, the data obtained through the administration of questionnaires were statistically

analyzed. The content validity and face validity for questionnaires to measure the attitudes of subjects. The questionnaire poses direct statements and requires the subjects to choose from a set of responses.

Reliability is viewed differently depending on the research method used. It is a requirement in quantitative research which aims at objective findings. In qualitative studies which are said to be subjective, it may not be required. The present study uses the Cronbach's Alpha method of reliability measurement, as a test for internal consistency, which falls under the instrument reliability category for the quantitative component of the study. The questionnaires were given to 10 physics students and 3 instructors as a pilot test. Cronbach's alpha was run to check the reliability of the questionnaire.

Finally, two versions of NA questionnaires were developed for students, and teachers, respectively. After revising the pilot questionnaire, the final questionnaire was given 206 physics students. In addition another questionnaire was designed for the instructors and final version was given to 17 related physics instructors, and, then preliminary results were validated by comparing findings across two questionnaires based on the research questions. All the items in the questionnaires were analyzed using the Statistical Packages for Social Sciences (SPSS) Version 22 except the two open-ended questions in last Sections of student and teacher questionnaires. These two questions were analyzed through categorization and description of the responses. Descriptive statistics included frequencies, percentages and the means were calculated for each item. For students' and teachers' attitudes towards the role of ESP in physics need analysis independent t-test, Chi-square and Mann-Whitney Test were applied to establish whether there was a difference among the participants in terms of their gender and attitudes towards ESP in physics curriculum.

DATA ANALYSIS

The Results of the Questionnaire: The First Research Question

The first research question posed in this study was: "what are the specific English language needs of Iranian physics students and graduates?" In order to answer this question, the descriptive statistic was run to show the number of students and graduated students by concerning the mean score of four main skills in English and other components. Table 1 presents the results of the test.

Table 1. Descriptive Mean Statistics of Students and Graduated Students

	education level	N	Mean	Std. Deviation	Std. Error Mean
speaking skill	student	153	2.6340	0.55904	0.04520
	graduated	53	2.5660	0.66533	0.09139
listening skill	student	153	2.8039	0.41452	0.03351
	graduated	53	2.7736	0.50541	0.06942
reading skill	student	153	2.9804	0.13910	0.01125
	graduated	53	2.9623	0.19238	0.02643

writing skill	student	153	2.8562	0.37025	0.02993
	graduated	53	2.8302	0.46969	0.06452
general vocabulary	student	153	2.8889	0.33552	0.02713
	graduated	53	2.7736	0.50541	0.06942
Technical words	student	153	2.9804	0.13910	0.01125
	graduated	53	2.9245	0.38476	0.05285
Pronunciation	student	153	2.7059	0.52418	0.04238
	graduated	53	2.5472	0.72234	0.09922
Grammar	student	153	2.5752	0.61444	0.04967
	graduated	53	2.6226	0.62716	0.08615

As it can be seen the number of student is (153), and the number of graduated students is (53); also you can see the mean score for different English skills and sub skills for students and graduated students. In order to be more objective regarding the mean comparison among participants of the two groups an independent sample t-test was run, the results of which are presented in table 2.

Table 2. Independent Samples T-test for the Mean Comparison of Students and Graduated Students

		Levene's Test for Equality of Variances		T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.						Lower	Upper
speaking skill	Equal variances assumed	3.250	.073	.725	204	.469	.06795	.09371	-.11682	.25272
	Equal variances not assumed			.666	78.929	.507	.06795	.10196	-.13499	.27089
listening skill	Equal variances assumed	1.175	.280	.433	204	.665	.03034	.07005	-.10777	.16844
	Equal variances not assumed			.394	77.615	.695	.03034	.07709	-.12315	.18382
reading skill	Equal variances assumed	2.151	.144	.736	204	.462	.01813	.02462	-.03041	.06666
	Equal variances not assumed			.631	71.736	.530	.01813	.02872	-.03913	.07538
writing skill	Equal variances assumed	.956	.329	.410	204	.682	.02602	.06343	-.09904	.15108
	Equal variances not assumed			.366	75.597	.715	.02602	.07112	-.11564	.16769
general vocabulary	Equal variances assumed	13.255	.000	1.874	204	.062	.11530	.06152	-.00600	.23660
	Equal variances not assumed			1.547	68.542	.126	.11530	.07453	-.03341	.26401
technical words	Equal variances assumed	9.854	.002	1.535	204	.126	.05586	.03640	-.01590	.12763
	Equal variances not assumed			1.034	56.776	.306	.05586	.05403	-.05235	.16407
Pronunciation	Equal variances assumed	13.138	.000	1.713	204	.088	.15871	.09263	-.02392	.34134
	Equal variances not assumed			1.471	71.884	.146	.15871	.10789	-.05637	.37380

grammar	Equal variances assumed	.136	.713	-.482	204	.630	-.04748	.09845	-.24160	.14664
	Equal variances not assumed			-.477	88.964	.634	-.04748	.09944	-.24507	.15011

As it is shown in this table the significance value for speaking, reading, writing, listening, and grammar are more than P-value but for general vocabulary is (.000), technical words (.002), and for pronunciation is (.000), which are lower than P-value.

Considering the Second Research Question

The second research question of the present study was what language skills physics students need to develop. In order to find out about this question, the following steps were taken. At first, Chi-square test was run among all the students and graduated students. Table.3 shows the summary of observed and expected counts for different items in second question in both students' and teachers' questionnaires.

Table 3. Summary of Observed and Expected counts of Question No.9

	Observed N	Expected N	Residual
1.00	121	74.0	47.0
2.00	38	74.0	-36.0
3.00	59	74.0	-15.0
4.00	67	74.0	-7.0
5.00	64	74.0	-10.0
6.00	74	74.0	.0
7.00	71	74.0	-3.0
8.00	98	74.0	24.0
Total	592		

The second research question sought information about the types of skills which physics students need to develop. As it is shown in table.5, students don't have sufficient satisfaction in vocabulary (observed No=121), translation (observed No=98), and finally in reading comprehension (observed No=74). The next step of the study shows the results of the goodness of fit Chi-square test in table 4.

Table 4. Chi square Test Results

	Q
Chi-Square	60.324 ^a
Df	7
Asymp. Sig.	.000

The test box in table 4 shows that the chi-square statistic for items in question number 2 in students' questionnaire is 60.324 at 7 degree of freedom, and gives a very low P-value (.000). In next step by using descriptive statistic as table 5 reported, the majority of students have lack of proficiency in number 1 (vocabulary), which is 20.4 percent, and for number 8 (translation), which is 16.6 percent.

Table 5. Descriptive Frequencies and Percentage of Students Needs in ESP

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	121	20.4	20.4
	2.00	38	6.4	26.9
	3.00	59	10.0	36.8
	4.00	67	11.3	48.1
	5.00	64	10.8	59.0
	6.00	74	12.5	71.5
	7.00	71	12.0	83.4
	8.00	98	16.6	100.0
	Total	592	100.0	100.0

Note: 1.Limited vocabulary 2.Pronunciation 3.Writing 4.speaking 5.Grammar 6.Reading comprehension 7.Listening 8.Translation.

Concerning students' ESP ability, instructors' opinions were calculated and the results are presented in the following tables.

Table 6. Summary of Observed and Expected counts of instructor's Opinions

	Observed N	Expected N	Residual
1.00	11	7.6	3.4
2.00	3	7.6	-4.6
3.00	8	7.6	.4
4.00	7	7.6	-.6
5.00	7	7.6	-.6
6.00	9	7.6	1.4
7.00	6	7.6	-1.6
8.00	10	7.6	2.4
Total	61		

Note: 1.Limited vocabulary 2.Pronunciation 3.Writing 4.speaking 5.Grammar 6.Reading comprehension 7.Listening 8.Translation.

As it can be seen from table 6, expected number is 7.6 and observed numbers are close to it. The next step of the study shows the results of the goodness of fit Chi-square test for instructors' opinions (table 7).

Table 7. Chi square Test Results

	Q
Chi-Square	5.754 ^a
Df	7
Asymp. Sig.	0.569

The test box in table 4.7 shows that the chi-square statistic for items in question number 9 in instructors' questionnaire is 5.754 at 7 degree of freedom, and gives a P value of (.569), which is higher than normal P-value.

Considering the Third Research Question

The third research question dealt with the ESP skills female physics students needed more or less in comparison with male physics students. In order to analyze this question

some T-tests and descriptive statistics were applied to examine the mean differences between the scores of females' and males' results, the results are presented in the following tables.

Table 8. Means Comparison of Males and Females of Four Main English Skills

	gender	N	Mean	Std. Deviation	Std. Error Mean
1.Q10	Male	118	2.9174	0.17001	0.01565
	female	88	2.8920	0.21035	0.02242
2.Q11	Male	118	2.7917	0.28197	0.02596
	female	88	2.7670	0.36317	0.03871
3.Q12	Male	118	2.8157	0.30387	0.02797
	female	88	2.7699	0.41214	0.04393
4.Q13	Male	118	2.8404	0.26812	0.02468
	female	88	2.8352	0.36532	0.03894

1.Reading, 2.Listening, 3.Speaking, 4.Wiring

According to the statistics depicted in tables 8, it can be seen that the mean difference of male and female for Q10 is 0.0254, for Q11 is 0.247, for Q12 is 0.0458, and finally for Q13 is 0.0052; which does not seem to be significant. In order to be statistically more reasonable an independent sample test was run for the scores of male and female students. The results are shown in table 9.

Table 9. Results of the Independent Sample t-test Between Male and Female Students' Scores

		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q10	Equal variances assumed	1.910	.168	.955	204	.341	.02533	.02652	-.02696	.07761
	Equal variances not assumed			.926	163.554	.356	.02533	.02735	-.02867	.07932
Q11	Equal variances assumed	3.446	.065	.548	204	.584	.02462	.04495	-.06400	.11325
	Equal variances not assumed			.528	158.923	.598	.02462	.04661	-.06743	.11668
Q12	Equal variances assumed	3.001	.085	.918	204	.360	.04579	.04988	-.05255	.14413
	Equal variances not assumed			.879	153.126	.381	.04579	.05208	-.05710	.14869
Q13	Equal variances assumed	.767	.382	.117	204	.907	.00517	.04413	-.08183	.09217
	Equal variances not assumed			.112	152.622	.911	.00517	.04611	-.08592	.09626

As it is shown in table 9 the p-value for the F of Q10 is sig (168), which means that the variances of male and female students are equal. In the column labeled sig. (2-tailed), the significance value (.341) is greater than 0.05. In other words, there was not a big difference among male and female students in claim of speaking ability.

In the next step, we use the one sample t-test to determine the mean difference obtained value of four main English skills. The results of the test are presented in table 10.

Table 10. One Sample T-test Results of Main ESP Skills

	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Q10	69.124	205	0.000	0.90655	0.8807	0.9324
Q11	35.192	205	0.000	0.78115	0.7374	0.8249
Q12	32.280	205	0.000	0.79612	0.7475	0.8447
Q13	38.494	205	0.000	0.83819	0.7953	0.8811

To determine whether obtained value is statistically different from a neutral value, as it is shown in table 10, regarding sig(.000), it is clear that we have a big difference in effect value of number 2 (rather important).

Considering the Forth Research Question

In order to investigate the last research question, the researcher used some non-parametric statistics. At first Mann-Whitney test was used to test mean rank of students and instructors in term of four English skills. The results are presented in table 11.

Table 11. Descriptive Mean Ranking of Mann-Whitney U test on target needs

		N	Mean Rank	Sum of Ranks
speaking skill	1.00	206	110.14	22689.00
	2.00	17	134.53	2287.00
	Total	223		
listening skill	1.00	206	111.38	22943.50
	2.00	17	119.56	2032.50
	Total	223		
reading skill	1.00	206	111.79	23029.50
	2.00	17	114.50	1946.50
	Total	223		
writing skill	1.00	206	111.34	22935.50
	2.00	17	120.03	2040.50
	Total	223		
general vocabulary	1.00	206	111.91	23054.00
	2.00	17	113.06	1922.00
	Total	223		
technical words	1.00	206	112.29	23131.50
	2.00	17	108.50	1844.50
	Total	223		
pronunciation	1.00	206	109.65	22587.50
	2.00	17	140.50	2388.50
	Total	223		
grammar	1.00	206	110.47	22756.50
	2.00	17	130.56	2219.50
	Total	223		

In next step we used the inferential statistics to display the differences among the mean ranks of the different groups. The results are presented in table 12.

Table 12. Descriptive Test statistics of Mann-Whitney U test on target needs

	speaking skill	listening skill	reading skill	writing skill	general vocabulary	technical words	Pronunciation	Grammar
Mann-Whitney U	1368.000	1622.500	1708.500	1614.500	1733.000	1691.500	1266.500	1435.500
Wilcoxon W	22689.00	22943.50	23029.50	22935.50	23054.00	1844.50	22587.50	22756.50
Z	-1.846	-.748	-.648	-.916	-.123	-.830	-2.490	-1.494
Asymp. Sig. (2-tailed)	.065	.454	.517	.360	.902	.406	.013	.135

The test statistics table 12 shows that the different U-values for the items; for example regarding speaking skill U-values (1368.00) and the associated P-value (.065). When the students and instructors were asked for the need to change the syllabus, the respondents gave some different opinions: the results are presented in the following table.

Table 13. Frequency Descriptive of students about Need to change in Physics ESP Curriculum

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	170	82.5	84.2
	no	32	15.5	100.0
	Total	202	98.1	100.0
Missing System	4	1.9		
Total	206	100.0		

As shown in table 13, about 84.2% of students answered (Yes) and 15.8% answered (No) to the question asked about need to change in curriculum. In table 16, the results of the instructors are presented.

Table 14. Frequency Descriptive of Instructors about Need to change in Physics ESP Curriculum

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	15	7.3	93.8
	NO	1	.5	6.3
	Total	16	7.8	100.0
Missing System	190	92.2		
Total	206	100.0		

As shown in table 14, the percentage of teachers who are in agreement with some changes in ESP course is 93.8%, and the percentage of those who disagreed with changing syllabus is just 6.3%.

DISCUSSION & CONCLUSION

ESP Needs of Undergraduates and Graduates

According to findings it can be said that undergraduate and graduate physics students generally have the same needs in terms of ESP in physics major. This is consistent with the literature, which suggests that students ESP needs are mostly in reading, technical words, general vocabulary and writing, on the other hand, listening, grammar, speaking, and pronunciation are least important factors for students and graduated students. According to Anthony (1997), most EAP classes consistently expose students to sufficient training in reading, writing, speaking and listening. From the trainings, then students are assumed to accomplish their specific professional functions that are required and necessary in their field of study or work. The finding in this study is in line with Eslami Rasekh and Simin (2011) who concluded that skills in EAP are academic reading as the primary skill, writing, listening and speaking as less and less demanded skills.

Healey (1999) states that since computer programs offer students the opportunity to develop skills such as skimming, scanning and recognizing main ideas and topic sentences, they are beneficial in improving reading skills. Moreover, by offering communicative tasks with listening options and pictures and animations they may be effective in enhancing students' motivation towards reading.

Language Skills Needed for the Students

Evans and Green (2007) investigating the language problems of Cantonese-speaking students at an English-medium university in Hong Kong. Their findings revealed that a significant number of students had difficulty studying their subjects in English, mainly due to inadequate receptive and productive vocabulary knowledge. The study conducted by Atai and Nazari (2011) further supports the outcomes of this study as in their study the results indicated that both EAP teachers and undergraduate students perceived problems with reading comprehension, general vocabulary, technical words and grammar.

Language Skills Required for Each Gender Group

As the literature review revealed, not many studies have conducted a comparison between female and male students in term of ESP needs for physics students in general and specifically in Iran. There is only some work considering role of gender on ESP, this study therefore tried to find answer to this gap about role of gender in physics student ESP needs.

According to the analysis in previous sections, it can be said that, although there is not any significance mean difference between male and female in four main skills in term of ESP needs for physics students, but, based on descriptive statistics depicted on chapter four, it can be analyzed that male participants mean differences are a little more than the females, though they are not significant.

Attitude Differences between Undergraduate and Graduates

In the last quantitative question in both students questionnaire and instructors questionnaire in term of their opinion about need to change in ESP programs for physics major, regarding the descriptive statistics in chapter four, it is clear that 84.2% of students agree to change about ESP curriculum in physics major, also instructors perception about changing in physics student ESP programs was about 93.8%; that means there is a big agreements between students and instructors in term of need to change in physics major ESP curriculum. Mazdayasna and Tahririan (2008) conducted a mixed-method study to investigate the foreign language learning needs of undergraduate medical sciences students. The results showed that all the teachers confirmed the necessity of change in their students' English education.

In last part of both questionnaires, participants were asked to write down whatever they think related to ESP needs of physics major. Summary of students and instructors points including their understanding of the wants, lacks, and suggestions are as following: first, they believe existing ESP courses did not satisfy their specific needs. In fact, they thought that they need more related courses than what were presented in their ESP courses. They mentioned that although reading skill is the most important skill in ESP, they need other English skills to accomplish their academic courses. Second, the graduates think if they had been taught to write articles and do more research in English by having some ESP courses in research and essay writing and using their teachers' professional supervision and feedback, they might be able to write English essays now. Last but not least, although the students find audiovisual materials very effective in enhancing learning, few ESP instructors use them in their classes.

On the other hand, instructors stated that the most important problem the students confronted was their poor writing and translation skills, in parallel with lack of appropriate materials, which could cover students' problems. Instructors believe that students after graduation are supposed to use English in writing articles, reading authentic materials, dealing with new technology and so forth, that make all of them have an appropriate language-proficiency, because of that an integrated system of teaching ESP courses in physics major is required. The instructors thought that participants would be satisfied with improving their writing through some supplementary essay courses in their last term. Another important point was students' lack of motivation. Motivation plays a crucial role in ESP; however, many of the students were not sufficiently motivated to learn English for their academic and occupational purposes, and making them aware of the essential role of English in their future might be uplifting.

CONCLUSION

This study aimed to identify undergraduates', graduates', and instructors' views towards the importance of ESP needs in physics major. The instructors' and students' opinions of their problems and needs, the role of gender, their opinions about a necessary syllabus

change, and suggestions for improving physics ESP curriculum were investigated. The findings indicated that both students and teachers believed in a change in the current curriculum, and they stated that physics ESP syllabus needs an urgent reconsidering. The importance of English skills according to the priorities for the students was as follows: Reading, Technical words, General vocabulary, Writing, Speaking, Listening, Pronunciation, and Grammar.

Regarding ESP skills need to develop, based on students opinions they have more problem with Limited vocabulary, Translation, Reading comprehension, Listening, Speaking, Grammar, Writing, and Pronunciation, but skills that students have problem with them in teachers opinions are Limited vocabulary, Translation, Reading comprehension, Writing, Grammar, Speaking, Listening and Pronunciation. In addition, the study also tried to determine whether gender has any effect on need analysis for physics major students; though observed mean difference for males was a little more than that of females, it could not satisfy the required significance for role of gender in ESP needs of physics major.

It was confirmed that instructors and students have an agreement about need to change with high percentages in ESP needs for physics students. The qualitative data also indicate that the teachers were affected by the number of students in a class. Since it might be difficult to deal with each student, the teachers might have problems in managing the students in ESP skills individually. Other findings show that teachers were also affected by technical problems that they faced in ESP. They stressed the importance of technical support while teaching ESP.

Finally, the researcher believes that more profound studies in ESP needs are needed with different methods like class observation, interview, and more representative population. Conducting more research on the ESP aspects can definitely help better understanding of students' ESP needs and consequently better understanding of methodology needed for reconsideration of physics curriculum.

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