

Stuck in the Gap: EAP Needs Assessment of Undergraduate Students of Computer Science

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Abstract

English for academic purposes (EAP) is a significant part of the curriculum in Iranian universities. However, it seems that EAP programs are in need of more rigorous needs analysis. This study was an attempt to assess present and target situation needs of two groups of computer science undergraduate students at Associate of Science (AS) and Bachelor of Science (BS) levels. A total of 320 students and 44 instructors participated in this triangulated survey. Data was collected through self-assessment, needs-analysis questionnaires, and semi-structured interviews. The results indicated a noticeable gap between the current EAP courses and both the present and target situation needs of learners. Basic language skills and sub-skills were more important to AS students due to their low level of general English proficiency; however, BS students focused on higher order language skills. Moreover, there were discrepancies between the two groups of undergraduates and their instructors regarding perceived needs. The findings provide implications for revising the current EAP curriculum for computer science students.

Keywords: English for academic purposes, needs assessment, computer science, undergraduate students

Introduction

Due to the status of English as an international language and advances in technology, there has been a worldwide increase in demand for EAP (Curry & Lillis, 2004; Hyland & Hamp-Lyons, 2002; Jordan, 1997). Although the medium of instruction in Iranian universities is Persian, English is mainly used for academic purposes in Iran, so that it currently forms a considerable component of the curricula for

all academic fields of study. The unifying feature of any EAP programs is defining the objectives and content of the course based on learners' needs (Alison, Corcos & Lam, 1994; Brinton, Snow & Wesche, 1989; Hamp-Lyons, 2001). In fact, learners' needs are fundamental to any learner-centered approaches to language learning (Hutchinson & Waters, 1987; Robinson, 1991; Savignon & Wang, 2003).

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The main point regarding needs analysis is conceptualizing the notion of 'need'. According to Brindly (1989, p.65), the main source of ambiguity is the distinction between various concepts of need. That is, the distinction between necessities, demands, and wants of the learners. Based on Berwick's definition (1989), 'need' is a measurable gap between the existing conditions and the desired ones.

Most importantly, needs assessment can be effective when the academic needs in target situation are clearly defined (Deutch, 2003); so, it is important to consider needs analysis with regard to the specific characteristics of the educational context under the study (Holmes & Celani, 2006). In Iran, EAP program started in mid 1970s with course books designed by Bates and Dudley-Evans (1975), Dudley-Evans, Shettlesworth, and Philips (1976), and Cowan (1974). After the Islamic Revolution (1978), the Ministry of Science, Research and Technology took the responsibility to develop discipline-based EAP programs for universities. It published eight EAP textbooks for such fields of study as science, humanity, sociology, engineering, medicine, and agriculture. However, it has been repeatedly reported that these materials are in need of more rigorous needs analysis (Atai, 2002; Eslami, Eslami-Rasekh & Quiroz 2007; Farhady & Hedayati, 2009; Mazdayasna & Tahririan, 2008; Tahririan, 1990). Since then central Iranian organization for university materials development (SAMT) has published nearly 200 EAP textbooks for various disciplines. The goal has been "to bridge the gap between learners' general English reading skill and their ability to read discipline-based texts" (Atai & Tahririan, 2003, p.4). These ESP textbooks are highly uniform in structure with the main focus on reading comprehension skills and translation.

Careful examination of the perceptions of learners and instructors seem to be important in determining the success of the EAP programs (Atai, 2002; Mazdayasna &

Tahriria, 2008; Eslami, 2010). The EAP for computer science undergraduates is an under-researched program. The only case found in the literature review was that of Atai and Shoja(2011). Therefore, based on the international importance of English language for disciplines such as engineering and science (Pritchard & Nasr, 2004), this study was carried out to find out language learning needs of two groups of computer science undergraduates, namely AS (Associate of Science) and BS (Bachelor of Science) students. The former group has been largely ignored and their voices unheard. The study addresses the following research questions: 1. What are the present EAP needs of Iranian undergraduate students of computer science at Associate (AS) and Bachelor (BS) levels? 2. What are the target EAP needs of Iranian undergraduate students of computer science at Associate (AS) and Bachelor (BS) levels? 3. Are there any significant differences between the two groups of undergraduates regarding their perception of present and target situation EAP needs? 4. Are there any significant differences between Iranian undergraduates and their EAP instructors regarding their perception of present and target situation EAP needs?

2. Method

2.1. Participants

A total of 320 undergraduate computer science students and 43 subject-specific instructors participated in the questionnaire phase of the study. In order to have representative views, AS and BS students were chosen through a cluster sampling procedure from six different universities in Isfahan, Iran: 1) University of Isfahan (UI), 2) Isfahan University of Technology (IUT), 3) Isfahan (Khorasgan) Islamic Azad University (KHIAU), 4) Falavarjan Islamic Azad University (FIAU), 5) Jihad University (JU), and 6) Aghigh University (AU). The instructors were from the same universities. All the students had passed the EAP course and were in their fourth to

Table 1.*Distribution of Participants Who Took Part in Needs Analysis Questionnaire*

| Occupation | Educational level | | | | Total number | Gender | | University | | | | | |
|------------|-------------------|-----|----|-----|--------------|--------|--------|------------|-----|-------|------|----|----|
| | AS | BS | MS | PhD | | male | female | IU | IUT | KHIAU | FIAU | JU | AU |
| Students | 150 | 170 | | | 320 | 126 | 194 | 62 | 52 | 42 | 48 | 60 | 56 |
| Teachers | | | 24 | 19 | 43 | 23 | 20 | 5 | 10 | 10 | 4 | 8 | 6 |

Table 2.*Distribution of Participants Who Took Part in Interview*

| Occupation | Educational level | | | | Total number | Gender | | University | | | | | |
|------------|-------------------|----|----|-----|--------------|--------|--------|------------|-----|-------|------|----|----|
| | AS | BS | MS | PhD | | male | female | IU | IUT | KHIAU | FIAU | JU | AU |
| Students | 22 | 19 | | | 41 | 14 | 27 | 5 | 6 | 10 | 7 | 8 | 5 |
| Teachers | | | 9 | 5 | 14 | 7 | 7 | 2 | 3 | 3 | 2 | 2 | 2 |

eighth semesters. Notably, in all the universities in the sample, EAP courses were taught by content teachers so ELT instructors were excluded from the study. Then, a group of 41 students and 14 content teachers were interviewed by the researchers. Table 1 illustrates the distribution of participants who took part in the needs analysis questionnaire. Table 2 displays the distribution of participants who took part in the interview section.

2.2. Instruments

Three kinds of instruments were used in this study: 1) GEP self-assessment, 2) needs analysis questionnaires, and 3) semi-structured interviews. Self-assessment technique was used in order to find out the learners' present levels of general English proficiency (GEP) based on six-point scale of the Common European Framework of Reference (CEFR). Questionnaires were developed based on current perspectives in needs assessment which emphasize triangulation and multiple approaches (Long, 2005; Zhu & Flaitz, 2005) and a combined theoretical model focusing on present situation analysis (PSA), target

situation analysis (TSA), and lacks and wants (Atai&Shoja, 2011; Dudley-Evans & St John, 1998; Hutchinson & Waters, 1987; Hyland, 2006; Jordan, 1997; Robinson, 1991; West, 1994). To avoid any misunderstanding, all questionnaires were developed in the respondents' native language, that is Persian. Finally, the main aim of conducting interviews was to elicit more information on participants' perception of needs, problematic areas, and expectations regarding the EAP course.

There were two sets of needs analysis questionnaires including those of students and content teachers. These questionnaires were developed after primary interviews with 10 undergraduates and 3 instructors. Following three questions on personal information, the students' questionnaire (Appendix A) had three sections. First, students were asked to assess their GEP based on the six-point scale of the CEFR. The second section consisted of 17 items (questions 1-17) to find out learners' target situation needs. The respondents were asked to express their opinions about the importance of each skill to their academic success on a 4-point Likert scale

ranging from 1 (not important) to 4 (very important). The third part was composed of 14 items (questions 18-31) which investigated the students' present situation needs. Items 18-28 were in Likert-scale format. Students were asked to analyze the effectiveness of the present EAP courses regarding their needs. Answers ranged from 1 (little) to 4 (very much). Items 29-31 were in multiple-choice format. The instructors' questionnaire consisted of two sections: target situation analysis (TSA) and present situation analysis (PSA) following the same format as that of learners. Both questionnaires were piloted with representative sample of participants and the items were revised. The Cronbach's Alpha analyses were conducted and high degrees of reliability were found .80 and .82 respectively. The content validity of questionnaires was checked by ESP specialists. Finally, in order to carry out a more in-depth study of the context, two sets of semi-structured interviews were developed for students and teachers (Appendix B) which dealt with the problematic areas in learning and teaching EAP as well as their comments to improve the current status.

2.3. Procedures

Data collection was done over the spring semester of 2014. After revising the questionnaires based on the pilot study, the two questionnaires were administered to the participants. The interviews with students

and instructors were tape-recorded and transcribed by one of the researchers. The results were analyzed through descriptive and inferential statistics including Chi-Square tests using SPSS 11. The results of interviews were applied to content analysis.

3. Results

3.1. GEP Self-Assessment

The undergraduates GEP self-assessment indicated a significant difference between AS and BS students: $X^2(4, N=320) = 103.850, P = .000$. As it is shown in Table 3, 68.0% of AS students assessed their levels of GEP as A₂ and 43.5% of BS students selected B₂. The results showed that the majority of the students were at A₂ to B₂ levels that is elementary to intermediate. In other words, a large number of students in the sample were limited users (38.1%, $N=122$ at A₂ level). Noticeably, AS students assessed themselves as weaker than BS students regarding their GEP.

3.2. Target Situation Needs (TSN)

The participants responded to 17-item section on the importance of language skills and sub-skills to the academic success of computer science students. In order to find out probable differences among respondents regarding their perception of TSN, a series of Chi-square tests were carried out. Table 4 summarizes the results. As it is shown, these groups (AS students, BS students, content teachers) had completely different perceptions of TSN.

Table 3. Results of GEP Self-Assessment

| Educational Level | | self-assessment | | | | | Total |
|-------------------|-------|-----------------|----------------|----------------|----------------|----------------|---------|
| | | A ₁ | A ₂ | B ₁ | B ₂ | C ₁ | |
| AS students | count | 16 | 102 | 26 | 6 | | 150 |
| | % | 10.7 % | 68.0 % | 17.3 % | 4.0 % | | 100.0 % |
| BS students | count | 12 | 20 | 60 | 74 | 4 | 170 |
| | % | 7.1 % | 11.8 % | 35.3 % | 43.5 % | 2.4 % | 100.0 % |
| Total | count | 28 | 122 | 86 | 80 | 4 | 320 |
| | % | 8.8 % | 38.1 % | 26.9 % | 25.0 % | 1.3 % | 100.0 % |

The undergraduate students at AS level perceived ‘knowledge of grammar’ (44.0%), ‘knowledge of general vocabulary’ (53.3%), ‘knowledge of technical vocabulary’ (49.3%), ‘pronunciation’ (42.7%), ‘using English-Persian dictionaries’ (49.3%), ‘reading specific texts’ (30.7%), ‘searching the Net with English key words’ (38.7%), ‘using General English software’ (33.3%), and ‘using technical software’ (40.0%) as important or very important to their academic success.

Table 4. *Participants’ Perceptions of TSN*

| Items | value | df | Asym. Sig (2-sided) |
|-------|--------|----|------------------------|
| 1 | 23.011 | 6 | .001 |
| 2 | 13.747 | 6 | .033 |
| 3 | 51.246 | 6 | .000 |
| 4 | 25.240 | 6 | .000 |
| 5 | 38.961 | 6 | .000 |
| 6 | 27.855 | 6 | .000 |
| 7 | 18.496 | 6 | .005 |
| 8 | 26.563 | 6 | .000 |
| 9 | 76.442 | 6 | .000 |
| 10 | 29.095 | 6 | .000 |
| 11 | 84.637 | 6 | .000 |
| 12 | 25.646 | 6 | .000 |
| 13 | 19.875 | 6 | .003 |
| 14 | 14.862 | 6 | .021 |
| 15 | 43.444 | 6 | .000 |
| 16 | 10.459 | 6 | .107 |
| 17 | 28.827 | 6 | .000 |

The undergraduate students at BS level considered all the above-mentioned skills as important except for ‘knowledge of grammar’. In addition to those skills, they selected the following ones as important or very important: ‘using English-English dictionaries’ (42.4%), ‘English-Persian translation’ (43.5%), ‘writing articles’ (42.4%), ‘listening comprehension’ (37.6%), and ‘writing emails’ (37.6%). On the other hand, subject-specific instructors perceived ‘knowledge of general vocabulary’ (54.5 %), ‘knowledge of technical vocabulary’ (81.8%), ‘pronunciation’ (45.5 %), ‘English-Persian

translation’ (45.5 %), ‘reading specific texts’ (40.9 %), ‘writing articles’ (50.0 %), ‘listening comprehension’ (31.8 %), ‘searching the Net with English key words’ (68.2 %), ‘using General English software’ (40.9 %), and ‘using technical software’ (77.3 %) as important or very important to students’ academic success.

The results of interviews also supported those of questionnaires, especially with regard to the importance of reading skill. Many content teachers stated that considering the growing nature of the computer science, reading English textbooks and translation were the main activities done in their classes. However, due to students’ low levels of GEP, especially AS students, studying Persian translation of textbooks is more popular. That is why teachers put more emphasis on learning vocabulary and reading skills.

3.3. Present Situation Needs (PSN)

Participants were asked to evaluate the effectiveness of the present ESP courses for computer science students (items 18-31). A set of Chi-square tests were conducted to find out any probable differences among the three groups. As it is illustrated in Table 5, there were significant differences among them regarding ‘pronunciation’, ‘conversation’, ‘reading specific texts’, ‘using online resources’, ‘writing emails’, ‘class time constraints’, and ‘reading English sources’.

Undergraduates at both levels perceived their EAP courses effective regarding ‘pronunciation’ (AS=53.3 %, BS=38.0 %), although their teachers selected ‘little’ (40.9 %). Considering ‘conversation’, 41.3 % of AS students stated the course usefulness as ‘very much’ whereas 38.8% of BS students and 63.6 % of teachers considered it as ‘very little’. The efficiency of the courses for AS students (54.7 %) and BS students (55.3 %) in ‘reading specific texts’ was ‘very much’, while that was the case only for 40.0 % of instructors. Students at the AS level (42.7 %) believed that online resources were used efficiently. This was in

sharp contrast with opinions of BS students and content instructors who selected it as 'little' (36.0% and 41.0% respectively). While BS students (56.5 %) and teachers (81.8 %) evaluated the efficacy of courses in "writing emails" as 'little', it was 'to some extent' influential for AS students (48.0 %). Class time constraint perceived to be sufficient for AS students (74.7 %), although for BS students (60.0%) and instructors (54.5 %) it was insufficient. Finally, the majority of AS undergraduates (61.3 %) mentioned that they did not study original English sources, whereas 68.2 % of BS students and 54.5 % of teachers stated the opposite.

Table 5. Participants' Perceptions of PSN

| Items | Value | df | Asimp. Sig (2-sided) |
|-------|--------|----|-------------------------|
| 18 | 2.142 | 6 | .710 |
| 19 | 6.977 | 6 | .137 |
| 20 | 5.932 | 6 | .204 |
| 21 | 43.173 | 6 | .000 |
| 22 | 22.974 | 6 | .000 |
| 23 | 8.527 | 6 | .074 |
| 24 | 18.111 | 6 | .001 |
| 25 | 7.974 | 6 | .093 |
| 26 | 20.429 | 6 | .000 |
| 27 | 69.089 | 6 | .000 |
| 28 | 8.049 | 6 | .090 |
| 29 | 2.142 | 8 | .710 |
| 30 | 38.920 | 2 | .000 |
| 31 | 28.086 | 2 | .000 |

As it was shown in Table 5, there were no significant differences among the groups regarding their opinions on the effectiveness of the ESP course in the following areas: 'knowledge of grammar, general and technical vocabulary', 'English-Persian translation', 'using technical software' and 'resources applied in EAP course'. On the one hand, all three groups mentioned that EAP courses were 'to some extent' useful in improving 'knowledge of grammar' (AS=45.3 %, BS=43.5 %, T=40.9 %). They believed that

the courses were efficient regarding 'general vocabulary' (AS=53.3 %, BS=41.2 %, T=40.9 %) and 'technical vocabulary' (AS=62.7%, BS=57.6 %, T=54.5 %). This was also the case with translation (AS=58.7 %, BS=56.5 %, T=40.4 %). On the other hand, they expressed that the EAP courses were inefficient with regard to 'writing articles' (AS=44.0 %, BS=40.0 %, T=38.0 %), and 'using technical software' (AS=40.0 %, BS=36.0 %, T=37.0 %). As with the last question considering the course resources, all groups mentioned 'EAP textbooks' the main one (AS=64.0%, BS=60.0 %, T= 72.0 %).

3.4. Interviews

The semi-structured interviews consisted of 4 questions. The first question focused on the instructors, whether the EAP courses should be taught by EFL instructors, content instructors, or both. Fifty percent of learners preferred to be taught by both EFL and content teachers, whereas 54% of the instructors expressed that in order to achieve the goals, the EAP courses must be taught by subject-specific teachers since they are more familiar with the target situation needs of the learners. With regard to the second question, the most problematic issues to AS students were the followings:

- students' low level of GEP, especially in such areas as knowledge of grammar, pronunciation and conversation,
- difficulty in memorizing the meaning of new vocabulary items, and
- overwhelming translation activities.

BS students also reported the above points as their major problems in learning EAP. Furthermore, they focused on 'writing articles' as an additional source of difficulty. They were also dissatisfied with the fact that other skills except reading had been totally ignored in the EAP courses. In the same way, what instructors referred to as their teaching problems were:

- students' low level of GEP,
- students' lack of motivation and interest,

- students' problems with memorizing new vocabulary items, and
- students' tendency to study Persian translations of the original books.

The third question dealt with the quality of current EAP/ESP textbooks for computer science students. All three groups believed that most of the EAP course books were outdated with the major focus on the reading skills, to the effect that other skills such as listening, speaking, and writing have been underrepresented. Moreover, the instructors stated that the reading passages are not closely related to what students study in their content courses, a limited number of technical vocabulary items are introduced, and grammatical points are presented inconsistently.

Finally, the fourth question asked respondents for their comments to improve EAP courses. The major points recommended by AS students were as follows: focusing on grammar and pronunciation, increasing group work activities, learning English in computer workshops or using computer in EAP classes, using audio-visual and multimedia aids, translating authentic texts (that is articles or excerpts of original books), focusing on all four skills (that is listening, speaking, and writing as well as reading), increasing class time or number of EAP courses.

BS students highlighted the following points: increasing class time or number of EAP courses, studying articles and original textbooks instead of EAP course books, giving class lectures in English, using multimedia and online sources, writing articles in English, and practicing in-class timed reading.

Nevertheless, content teachers focused on the following issues: developing students' level of GEP, teaching more technical vocabulary items, presenting EAP as supplementary courses throughout students' education, studying articles and other original sources, writing assignments in English, and collaboration of EFL and content teachers.

4. Discussion

The findings of GEP self-assessment, needs analysis questionnaires and interviews demonstrated that undergraduates' low level of GEP was the cornerstone of challenges they face in EAP courses; however, the case was more critical for AS students. This finding is in line with Atai (2002, p.26) who argues that "it is doubtful whether university students have internalized the necessary academic skills and reading strategies before being exposed to authentic sources", and those of Atai and Tahririan (2003, p. 17), and Eslami (2010, p. 7).

Generally speaking, 'Knowledge of both general and technical vocabulary', 'translation', 'reading skills', 'searching the net with English key words', and 'using English software' were frequently noted as major target situation needs by learners. However, there were discrepancies in the perceptions of undergraduates and content teachers regarding the target situation needs. Due to their low level of GEP, basic language skills and sub-skills such as knowledge of grammar and vocabulary were more important to AS students; however, BS students focused on higher order language skills such as 'writing articles', and 'delivering lectures'. Teachers highlighted 'knowledge of technical words', 'reading', 'translation', 'writing articles', and 'using technical software' as the most important skills. According to Robinson (1991, p.8), "when there is a discrepancy between students' course of study and the one which they would prefer...we might expect students and teachers to have different views of the goals and content of the ESP course." It seems that content teachers focused on the priorities based on what is necessary in target situation, but students declared their preferences based on their personal needs. Therefore, like Atai and Shoja (2011), it can be concluded that the content of EAP course is highly affected by general English proficiency of the learners which shows the necessity of redefining the target situation

needs taking into account both teachers and learners perspectives. This is in line with what is proposed by Deutch (2003) and Holmes and Celani (2000).

The results revealed significantly different perceptions of the present situation needs with regard to basic skills and sub-skills of pronunciation, conversation, reading specific texts, and such higher order skills as using online resources, and writing emails as well as class time constraints. However, all groups mentioned the effectiveness of EAP courses regarding grammar, vocabulary, and translation, which is line with what Atai and Shoja (2011) and Eslami-Rasekh and Valizadeh (2004) observed in ESP courses: Grammar translation method is still prominent in Iranian universities. This indicates that EAP learners in Iran experience a traditional, form-focused foreign language education with little opportunity to use English for communicative purposes. Moreover, all three groups stated that the course was ineffective regarding writing articles, using technical software and reading original sources. Apparently, the content of current EAP courses meets neither the present nor the target situation needs. Furthermore, specific needs of the two groups of undergraduates are not discriminated. One of the problematic areas frequently noted by AS students is the fact that their GEP program at secondary education is different from BS students (There are only two general English courses for the former group while the latter are required to pass 4 general English courses). Despite this fact, there are no special programs or supplementary materials provided to concentrate on the basic language needs of AS students. This gap seems to be due to the absence of rigorous needs assessment or lack of more updated research-based ESP and EFL curriculum development and syllabus design. In other words, as Atai and Tahririan (2003, p.17) claim, "Iranian ESP context is a specially marked one because the students do not generally enjoy optimum general English proficiency levels prior to

enrollment in ESP." It is also noteworthy that although in Iranian universities, undergraduates are required to pass 3 to 5 credits of general English course before taking ESP, these courses are not very helpful since they mainly follow the same traditional grammar translation method.

5. Conclusion

Based on the findings, it can be concluded that although the EAP courses under the study were effective, they could not fully prepare the students to face the challenges of the target situation. This is due to the fact that course designers have not considered the undergraduates' low level of general English proficiency. The discrepancies found between the two groups of undergraduates emphasize the importance of revising the curriculum based on needs assessment. Some remedies for current situation include: a) offering some complementary courses to help students with their GEP (especially for AS students), b) revising the current EAP textbooks to include other skills as well as reading, c) increasing the number of EAP courses to give learners more opportunity to achieve their goals, d) supplying the EAP classes with computers to help students learn what they need in practice, and e) providing group teaching methods to enjoy the expertise and skills of both content instructors and language teachers.

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Appendix A**Questionnaire**

Dear Participants,

The following questionnaire is part of a research project that investigates the academic language needs of computer science students. Your answers will be kept confidential.

Personal Information

University:

Gender:

Educational Level:

Part A

Six levels of competence in foreign language described by the Council of Europe are given below and are ranked from weakest (A1) to strongest (C2). Please circle the level corresponding to your present competence.

A1: Read simple words and phrases in everyday life; understand words, basic and familiar expressions in a limited context; write short, specific information; say basic expressions, phrases and ask simple questions on familiar subjects.

A2: Read short and simple texts for gist or for specific information; understand expressions and common vocabulary relative to my immediate environment; write short, simple notes and messages; respond on familiar topics, describe my university course, in simple terms, carrying on very limited conversation.

B1: Read texts written in everyday language, or relative to my studies, although rather slowly; understand key points in clear and standard speech when people speak slowly on familiar topics; write coherent texts or notes on familiar subjects; generally explain my opinions or projects spontaneously participate in conversation on familiar topics.

B2: Read articles or reports expressing a particular point as long as there is adequate time; understand longer talks and follow complex lines of argument on familiar topics; understand most news programs in standard dialect; write clear and detailed texts, reports and essays on topics in my field; express myself clearly and in detail, actively participate in conversation on topics relative to my interests; spontaneously communicate with a native speaker.

C1: Read longer, complex, specialized texts, appreciating differences in style, in a reasonable time frame; understand extended speech, even when it is not clearly structured, TV programs, with relative ease; write clear, well structured texts, developing my point of view on complex subjects; describe complex subjects clearly and in an appropriate manner; express myself spontaneously, clearly and easily in professional or social contexts.

| | not important | rather important | important | very important |
|---|---------------|------------------|-----------|----------------|
| 1. knowledge of grammar | 1 | 2 | 3 | 4 |
| 2. knowledge of general vocabulary | 1 | 2 | 3 | 4 |
| 3. knowledge of technical vocabulary | 1 | 2 | 3 | 4 |
| 4. pronunciation | 1 | 2 | 3 | 4 |
| 5. conversation | 1 | 2 | 3 | 4 |
| 6. using English-Persian dictionaries | 1 | 2 | 3 | 4 |
| 7. using English-English dictionaries | 1 | 2 | 3 | 4 |
| 8. translation from English to Persian | 1 | 2 | 3 | 4 |
| 9. reading specific texts | 1 | 2 | 3 | 4 |
| 10. doing homework | 1 | 2 | 3 | 4 |
| 11. writing articles | 1 | 2 | 3 | 4 |
| 12. listening comprehension | 1 | 2 | 3 | 4 |
| 13. giving lectures | 1 | 2 | 3 | 4 |
| 14. writing emails | 1 | 2 | 3 | 4 |
| 15. searching the Net with English keywords | 1 | 2 | 3 | 4 |
| 16. using English instructional software | 1 | 2 | 3 | 4 |
| 17. using technical software | 1 | 2 | 3 | 4 |

C2: Read any type of text easily, even abstract or complex ones, appreciating subtle distinctions of style, implicit and explicit meanings; understand any kind of spoken language as long as I have time to become familiar with a particular accent; write clear, stylistically appropriate texts; write summaries or critical reviews; describe or argue complex subjects clearly and easily, in an appropriate manner; express myself in any situation in standard, idiomatic language with appropriate nuances.

Part B

How important are the following language skills and sub-skills to your academic success? Please choose a number from 1 to 4 based on the importance of each item. (1: not important, 2: rather important, 3: important, 4: very important).

Part C

How effective have been your EAP courses in improving your abilities in the following skills and sub-skills. Please choose a number from 1 to 4. (1: little, 2: to some extent, 3: much, 4: very much).

29. Which of the following sources have you studied in your EAP course?

- EAP textbooks
- Articles
- Materials developed by instructor
- Original books
- Others (mention)

30. Do you feel satisfied with the number of EAP courses offered to undergraduate students of computer science?

- yes
- no

31. Do you study English sources in other content-specific courses?

- yes
- no

Appendix B

Semi-structured interview

1. Should EAP courses be taught by computer instructors, EFL teachers, or both?
2. What are the major learning problems of undergraduates regarding EAP?
3. Are you satisfied with the current EAP textbooks?
4. What are your suggestions for improving EAP courses?

| | little | to some extent | much | very much |
|---------------------------------------|--------|----------------|------|-----------|
| 18. knowledge of grammar | 1 | 2 | 3 | 4 |
| 19. knowledge of general vocabulary | 1 | 2 | 3 | 4 |
| 20. knowledge of technical vocabulary | 1 | 2 | 3 | 4 |
| 21. pronunciation | 1 | 2 | 3 | 4 |
| 22. conversation | 1 | 2 | 3 | 4 |
| 23. translation | 1 | 2 | 3 | 4 |
| 24. reading specific texts | 1 | 2 | 3 | 4 |
| 25. writing articles | 1 | 2 | 3 | 4 |
| 26. using online sources | 1 | 2 | 3 | 4 |
| 27. writing emails | 1 | 2 | 3 | 4 |
| 28. using technical software | 1 | 2 | 3 | 4 |