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English for Computer Science : Students'Needs to Enhance Technical Writing at Tlemcen University

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Introduction

The English language overlaps computer science discipline as it is the lingua franca for computing. Within the same line of thought, most computer science terminology is loaned from the English language. On account of technical restrictions of computer and limitations of International criteria on the Internet, internet users and software engineers along with analysts programmers, not least Computer Science students, and their instructors are required to fully use English keywords when using the network, coding and analyzing a computer program and so forth.

Accordingly, the importance of English in all disciplines calls into play the need for teaching/learning the language. Following the footsteps of the saying 'necessity is the mother of invention'English for Specific Purposes (ESP) was born out of the disciplines'requirement into the land of countries where English is as a Second Language or ESL, and English as a foreign language, or ESL. Thus, teaching the language which is appropriately related to the field at hand, improving required skills in the discipline, and meeting students'needs is what gives ESP over to the specificity of teaching/learning context (Žufková, Kližanová, Vivoda & Kyselovic as cited in Brahimi, 2017 :.334).

Consequently, in an ESP situation, where nothing strikes fear into the heart of a language teacher quite like being asked to teach a specific group major in a completely unlike discipline, most of the time more scientific streams, with different students'levels. To cope with the existing situation, the researcher has to go through a needs analysis process to draw his/her students'profile to facilitate the burden

of teaching specifically. An ESP teacher training is required as well as a major for efficient ESP teachers.

In Algeria, precisely, what makes the situation very hard going teaching practice is the lack of teacher training along with needs analysis operation in the ESP field. Therefore, the Algerian ESP classrooms remain motionless towards the development of their disciplines'requirements. One can say that the status of ESP in Algeria is in its infant stages as the tertiary educational systems stand aloof from the state of the art teaching approaches.

With this in mind, and when the ESP case comes to a head, not least in the Algerian context, here lies the chief importance of research. Thus, a needs identification study was undertaken among Master 1 students at the Computer Science Department at Tlemcen University, Algeria. So that to determine the students'learning needs, linguistic elements required in the target situation for technical writing in computer science. Since English in computing is the large gateway to success through having access to regularly updated websites, computer programs, coding systems

1. Review of the Literature

Due to the growing mass of inhabitants in the city of ELT, stout spirits find themselves in need to set off a great deal, to say the least in terms of seeking their share in next-door neighbors'land. Engineers, doctors, scientists…, those neighbor tribes were ventured out into a daring journey by some people of ELT to settle down a brand new city, which they named after their purpose of adventures, ESP (Hutchinson & Waters, 1987, pp.01). English for specific purposes (ESP) as sprigs of the teaching of English as a Second or Foreign language (ESL/EFL) per se that are the paramount offshoots of the tree trunk of ELT.

ESP, thus, is meant for designing courses to meet learners'needs. That is, it based its instructions on the needed requirement of the target situation cutting off the edges of the unnecessary elements which do not serve the learning purpose. Consequently, that what makes a difference between General English (GE) and ESP where the

courses provided differ depending on the target situation, for instance, the English taught to engineers is greatly distinct from that taught to lawyers. ESP is « an approach to language teaching in which all decisions as to content and methods are based on the learner's reason for learning » (Hutchinson & Waters, 1987, pp.19).

ESP is an approach to teaching within which all choices on content and ways square measure supported the learner's reason for learning. It focuses on the specificity of each group along with the needed language items, skills, activities as a preparation to command a good use of English for academic and professional settings. As pointed out by Paltridge and Starfield (2013, p. 2) :

> Referring] to the teaching and learning of English as a second or foreign language where the goal of the learners is to use English in a particular domain. […] A key feature of an ESP course is that the content and aims of the course are oriented to the specific needs of the learners. ESP courses, then, focus on the language, skills, and genres appropriate to the specific activities the learners need to carry out in English.

As far as Computer Science is Concerned, ESP lectures at Tlemcen University must be designed to revolve around the specific terminology of computing, language skills as prerequisites to develop the specific writing of Master 1 students. Considering this, it falls to the ESP teacher to meet the required needs of his/her students to improve their English written communication regarding computing. The computing English lectures should highly integrate the career-specific vocabulary, and immerses students in the other language components, i. e, listening, speaking and reading (Dudley-Evans & St John, 1998).

The cornerstone of any course design is needs analysis. Within the same vein, the current study aims to analyze the site under investigation at the Computer Science Department, Tlemcen University, Algeria. For promoting the writing skill among ESP computing learners for their future professional careers by providing a suitable course that meets their needs.

3. Needs Analysis

Needs analysis is the building block of ESP, yet, it is the base for designing ESP courses (Johns, 1991 as cited in Li, 2014, pp. 1869). It is the « awareness of a target situation- a definable need to communicate in English- that distinguishes the ESP learner from the learner of GE » (Hutchinson & Waters, 1987, pp. 54). Simply put, it is to identify what should be done to command English to succeed in your specific field. Moreover, needs analysis is the process of gathering information about the learners being taught to be familiar with their needs to design the courses upon them.

Needs in a needs analysis process are the « ability to comprehend and/or produce the linguistic features of the target situation, for example, the ability to understand the passive voice » (Hutchinson & Waters, 1987, pp. 54). One way of doing so is by procedures and activities for collecting data to be used in syllabus design (Nunan, 1994). Needs analysis tells us the very first step of course design (Johns, 1991 as cited in Li, 2014, pp. 1869).

The identification of the target situation requirements is at the core of the needs analysis process (West, 1998 as cited in Irshad & Anwar, 2018, pp. 160). That is, the language components and skills which are identified through NA along with the students'current knowledge can permit to define the syllabus goals. Target situation analysis is about the learners'needs at the end of a language course (Jordan, 1997). The syllabus, thus, is developed from the methodical analysis of the target situation. As a result, a target situation analysis within the needs analysis is pivotal in course design. The course developer draws the content of his syllabus on the goals and objectives which point out what should be done as the learning process is taking place (Hutchinson & waters, 1987). Goals and objectives need to be fulfilled in each unit of teaching to meet the requirements of the target situation (Brown, 1995).

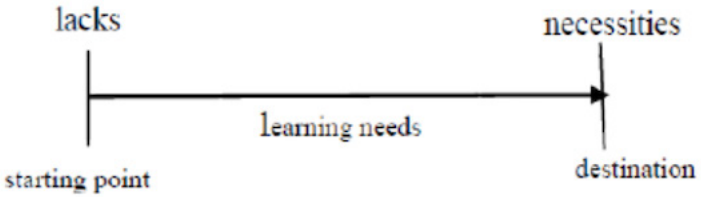
Needs analysis has different approaches. In addition to Target's situation analysis, Present situation analysis is about identifying the learners'ability at the beginning of the lecture (Dudley Evans &

St. John, 1998). Moreover, the operation of identifying ones'needs goes through stages in these approaches, like in the Communicative Syllabus Design introduced by Munby (1978 as cited in Hutchinson & Waters, 1987, pp. 54). The gist in CSD is the Communicative Needs Processor (CNP), in which Munby (1978) set out procedures for finding out target situation needs via a set of questions about major variables (Participants, what they already know, and medium, wants, …) (Hutchinson & Waters, 1987).

Approaching needs analysis from a target situation analysis of needs is not sufficient. The anecdote of the ESP course begins with one small step which is identifying the route. Next, the journey continues to get your point across by linking destination (target situation needs) and the point of departure (present situation needs), i. e, the path to walk on (Hutchinson & waters, 1987). This reveals the existence of another type of needs which is the learning needs. Smith (1984 as cited in Hutchinson & waters, 1987, pp.61) claimed that the telltale of needs analysis focusing on the knowledge and abilities required to keep the learners on target does not show « how » these learners «learned » these language skills and abilities.

Hutchinson and Waters (1987) proposed a needs analysis model drawing an analogy of a journey (see Figure 1 below) which consists of two phases : the target situation needs and learning needs. Target needs are composed of necessities, lacks, and wants. Necessities are what permits students to act efficiently in the target situation (journey's destination). Lacks are the needed abilities to reach the end purpose (the start of the journey). Wants are the learners'desires which are subjective in the course design procedure. On the other side, Learning needs are the learners'approach to learning the language, i. e. how they get from the starting point to the destination. In addition to their motivation and learning preferences which may deviate the terminal point of the journey to achieve better language proficiency.

Figure N° 1. Hutchinson and Waters Needs Analysis Model



Source: adapted from Li, 2014 : 1871

4. Methodology

In Hutchinson and Waters (1987) model of needs analysis, to arrive at the truth of the learning situation in an ESP context, ESP course designers must consider the route (learning conditions) between the starting point (lacks) and destination (necessities) of the target situation needs (Hutchinson & waters, 1987). Following their model ensures having an in-depth needs analysis of the participants in the site under investigation. Target needs and learning needs of Computer Science learners at Tlemcen University is the ultimate goal of the current research work. In other words, what are the linguistic needs required to write technical English in Computer Science discipline? How do Computer Science learners best learn the required language elements to write technically?

5. Setting Description

In the Computer Science Department along with the Mathematics Department at faculty of sciences, TLEMCEN University, Algeria, students have a common program in their first year of study. Afterward, they have to choose between computer science as major or mathematical studies. At the master level, the two specialties get subdivided into sub-options. The common core program of English for first-year Computer science and Mathematics students is instructed during the first term of the academic year. From an administrative

point of view, a low coefficient is given to the module of « technical English » in comparison to the other modules. This educational decision modeled the English standing in the former Department which in turn shaped students'attitudes and their teachers'stands on English language teaching. Consequently, unqualified novice teachers are assigned without the needed necessities of the ESP teaching/ learning operation. Moreover, they lack awareness of computer science content knowledge which leads to inappropriate curriculum development resulted in low students'motivation to attend lectures.

6. Participants

Master 1 students with their teachers in the Departement of Computer Science, Faculty of Sciences, Tlemcen University, Algeria, make the sample population up of the current needs analysis process. The randomly selected master's students as informants represent 56 % of the whole population. That is, master 1 students in the computer science department are 140 among whom 40 were taken part in this investigation. The students'sample falls into 17 males and 23 females ranging in age 21 to 25 years old, who were streamed for science in the secondary school, where they had Arabic as the sole medium of instruction. Thereafter, however, they had confronted an unpleasant state of affairs whereby the French language is the only medium of instruction and communication in the computer sciences studies at University. Despite that fact, and owing to the globalized world of today, the educational authorities in the Algerian tertiary system, not least the computer science department at TLEMCEN University tenders a mandatory « technical English » module (ESP) for only one semester in their first year at University and for 3 semesters in their Master degree as well. Thus, students attend ESP courses with decreased motivation and different attitudes towards the English language.

On the other side, 10 subject specialists were selected to play a part in the current study ; who are teaching different modules in Computer Science Department. In the same scheme, 3 English teachers who are in charge of teaching 'Technical English'to Master 1 students took

part in the investigation. Most of the selected computer scientists earn a Ph.D. degree, and the English Teachers have Magister and License degree.

7. Research methodology instruments

The researcher focused on needs analysis procedures to collect students'constructs towards the module of 'Technical English'ESP) along with their teachers'attitudes on the syllabus of ESP courses. She opted for a questionnaire of 15 elements for Master 1 students to unveil their target and learning needs in the computer science department. The questionnaire was administered to 40 informants during a classroom session to specify their necessities, lacks and wants in the Computer Science field. In addition to this, a semi-structured interview was addressed to 10 computer scientists, which is made up of an array of questions arranged from the signification of English in the field under investigation to the English requirements in computing to improve students'writing ability. Moreover, another semi-structured questionnaire was directed to 3 ESP teachers at the Department to highlight the ESP syllabus content, to identify the transmission of these current lectures, and to categorize the students'needs to write technical English. The use of multi-triangulation research methods is to assure the validity of the research study, and for the probable generalizability of the research findings.

8. Results and discussion

The analysis of the obtained data was done qualitatively and quantitatively. The students'questionnaire aiming at unveiling both their target needs and learning needs to write technically in the field of computer science was analyzed qualitatively and quantitatively. Furthermore, the semi-structured interviews for either computer scientists or ESP teachers were analyzed both qualitatively and quantitatively as well as gathering the data related to ESP syllabus content, teaching method, and students'needs in this study. The data gathered are laid out below.

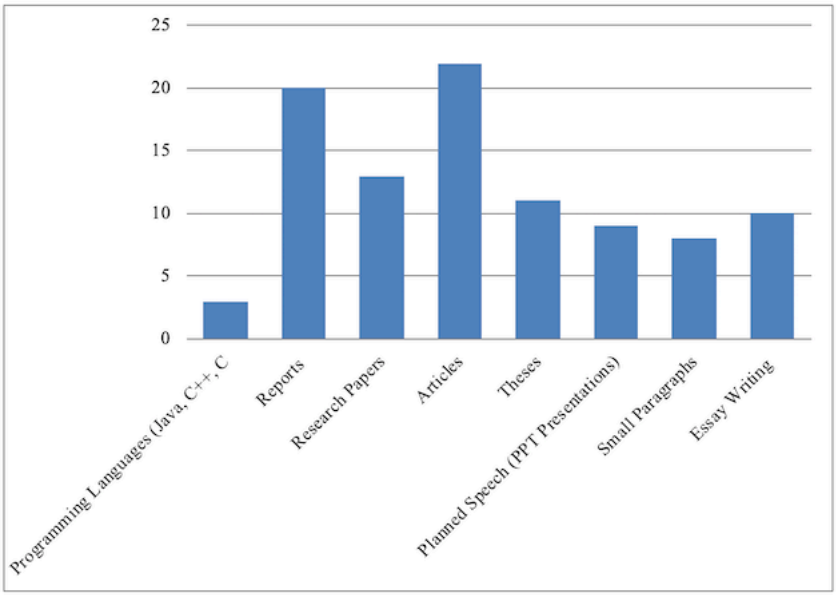
8.1. Students'Questionnaire

- Attitudes towards learning English and the compulsory activities within which the use of specific English is required

As for the students'attitudes towards learning English (Figure 2), the great number of the respondents (38 informants) agreed that they enjoy learning English. However, only (2) informants hold a negative attitude towards English classes. The results of the requisite activities in the computer science discipline within which they have to use technical English revealed that 22 subjects concurred using technical English specifically for writing articles at the doctorate level which elevates the activity to the first rank. 20 respondents opted for articles as the second activity which required using technical English. The third classified activity is writing research papers as an assignment given by the English teacher to academically write about research works conducted in their field, by 13 students.

The fourth required activity, by 11 informants, is writing research theses or dissertations at the end of their Master and Doctorate Degree (not obligatory, they can write in French as well). Yet, 10 students chose essay writing as the fourth present needed activity which is set by the current English teacher. The next activities were ranked as follows : the fifth activity is about planning speeches (PPT presentations) by 9 subjects. According to 8 informants, the needed activity to be accomplished is to write small paragraphs like the first step in technical writing. The final ranked activity is the use of technical English when programming, by only 3 subjects.

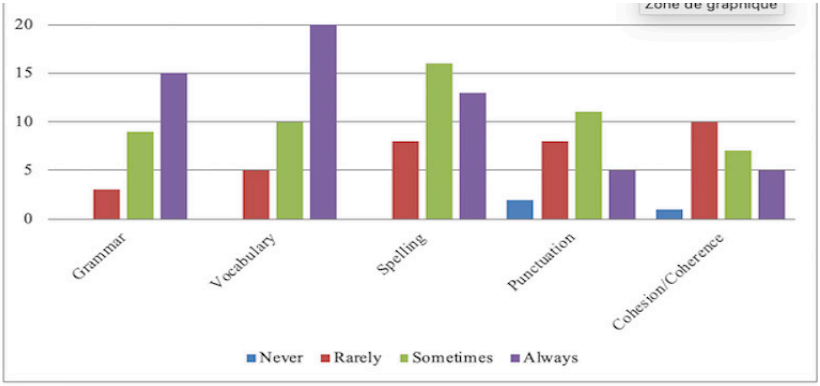
Figure N° 2. Mandatory Computer Science Language Activities



Difficulties of written expression and their causes

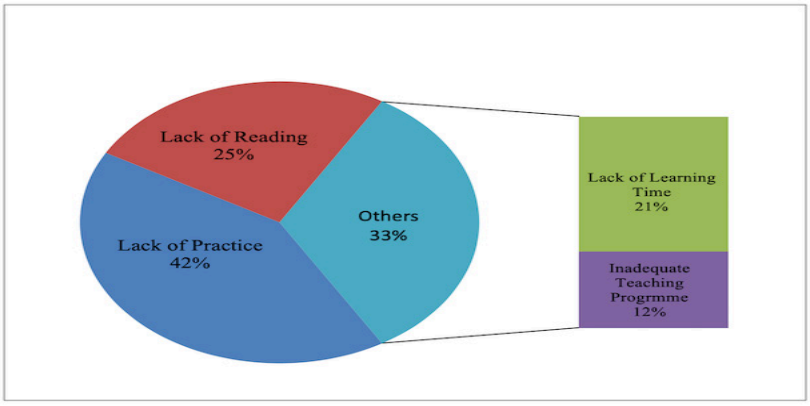
Figure 3 below shows that a clear majority of informants (20) complaining about having major problems at the level of vocabulary, especially the specific register of computer science. As for spelling difficulties, most informants (16) proclaimed that they always, or sometimes, encounter such deficiency. Additionally, from the next figure, one can notice that grammatical difficulties are the subsequent challenging hurdle for Master 1 computer science students with (15) subjects. Last but not least, writing mechanics problems (punctuation) along with cohesion and coherence difficulties remain the last two obstacles which students suffer from when writing technically with (11) respondents reported that they sometimes encounter punctuation problems, and only (10) subjects declared that they rarely have cohesion and coherence difficulties due to the nature of writing type required in scientific fields, i. e, simple and plain language in technical writing.

Figure N° 3. Mandatory Computer Science Language Activities



The findings of the question related to writing difficulties causes (Figure 4) revealed that the majority of respondents agree with all the proposed reasons behind deficient performance in writing. The vast majority of informants (28) ascribed deficiency in technical writing to lack of practice. In regards to the second chosen cause, 17 informants view that lack of reading general or specific documentation in their field is also an important factor that causes poor writing achievement. The rest of the students (10) stated further causes like lack of time devoted to learning writing with an inadequate ESP syllabus.

Figure N° 4. Causes of Students'Difficulties



Technical English lectures and the emphasized skills

Concerning the technical English lectures they have, the majority of students (23) confirmed that they have sometimes some English lectures devoted to their field of study ; 15 students stated that they have in a lot of time only « General English » lectures. In these lectures, the teacher main skill to focus upon the most is : according to 25 informants, their teacher gives importance to reading, followed by the listening skill which was selected by 19 students. Then, they added that writing is emphasized through essay writing activities by 15 informants. The last skill the teacher focus on is speaking by 12 subjects.

- Linguistic elements needed to write technical writing and Students'Preferences

It was obvious from the reported answers that the most needed language component falls in favor of computer science terminology (lexis) at its morphological and semantic levels with a percentage of 72 %. Other respondents (28 %) selected grammar as the main required element to develop correct writing in technical English. As a result of this, the following question was about finding out the students'preferences for the technical English teaching approach. The vast majority of informants (22) agreed that the content-based approach is the magical recipe to be followed by the ESP teacher along with the language skills integration to learn technical writing. The language-based approach was the choice of 17 subjects. Finally, 15 students opted for the task-based approach as the best way to teach technical English in computer science.

8.2. ESP Teachers'Interview

- ESP teaching practices

The interviewed language teachers claimed that they instruct solely the technical English for students'benefits. However, when asked whether they are satisfied or not with their students'level of English, most of them made a face to express that they have a moderate level in English, in general. Concerning the ESP syllabus, teachers replied that it is not collaboratively designed either with other language teachers or with the subject specialists, and it is not planned by the department administration nor the ministry of higher education. Therefore, the

instructed syllabus is randomly designed from various web documents attached to computer science.

- Writing in the discipline

The answers to this question were diverse. One teacher only indicated that her main focus of attention is to develop mostly the writing abilities of her students along with other skills. Two other teachers argued that they emphasize other skills (listening-reading) in ESP lectures with giving little importance to the writing skill. As for writing in the discipline, once again some teachers'responses to this question revolves around the importance of writing in their students'field of study, however, they admitted that they attach less attention to its importance in the classrooms. Then the interviewees were required to give information about the major hindrances characterizing their students. Teachers revealed that their students face difficulties at the level of form (grammar, spelling, vocabulary, and punctuation) as well as the computer science content language. ESP Teachers ascribed such difficulties to lack of reading and practice. Moreover, some others went beyond and added that their students show poor motivators to learn specific writing.

- Further suggestions

To sum up, teachers recommended using the content-based approach as the best teaching method to develop the students'technical writing in the field of computer science. Furthermore, they stressed the importance of skills integration in the ESP lecture to meet the students'needs in the discipline. In regards to students'motivation, teachers raised the bar on quality teaching, students'interest and interactive lectures.

8.3. Computer Scientists Interview

- The importance of English in Computer Science studies

All the respondents are computer scientists who hold the status of instructor doctors and assistant professors in the computer science department and they are familiar with English requirements in their field of research. Their specialties arrange from networks and distributed systems, software engineering to information technology

… and they are well aware of the major significance of English in the computer science discipline as well as their students'needs in their field. Most of the subject specialists teachers spotlighted the importance of technical English to write scientific articles about the computer science field of research, yet, they urged the need to develop more specific writing abilities. In addition to this, they added that international academic communications, exchanged study programs, scholarships and conferences require a good command of oral-spoken abilities of English.

- Need skills in the field

As previously mentioned, most teachers insisted on the urgent need to develop mostly technical writing in the discipline to have the required qualification at a post-graduation level (Ph.D.). Besides the writing capabilities, they also have to acquire computer science terminology to facilitate the task of technical writing. Reading is highly required according to subject specialists teachers to foster language mastery. Finally, they added the significance of other skills, especially speaking to the overall process of English language learning.

- Recommendations for Improvement

All the informants concurred with the urgent requirement of technical English command that must be fully met. This English command allows students to have access to the worldwide gates of the updates in the research, technological advancement and international communication. Consequently, they indicated that the module of technical English must be provided in the three years of Licence Degree as well as the two years of Master'S. The suggestions were directed towards more language teacher and subject specialists teachers'collaboration process for students'benefit.

9. Discussion

The gathered data from all the research instruments used in the needs analysis process revealed the high importance attached to the English language in computer science studies. This was confirmed by the master 1 students, language teachers, and subject specialists. In

the same line of thought, the ESP syllabus content was not cautiously designed to meet the technical English requirements in the discipline. A content-based approach is advisable for a syllabus design approach and as a teaching approach in an ESP context.

After analyzing the target needs of the students, master 1 students, their language teachers, and subject specialists teachers approved the need to command good English to mainly write scientific articles as the main necessities required in the field. To achieve this goal, promoting computer science terminology through reading-related simple documentations, accordingly ; this may help students comprehend the computing materials to write technically. moreover, they specified the linguistic elements required to build up a sound register in computer science field are the lexical, semantic levels to reinforce the vocabulary acquisition. Also, the grammar is of great importance in the English language, if vocabularies are the building blocks of the language, grammar is a mortar of the English language.

As for the learning needs, students highlighted the importance of integrating the four language skills to improve writing ability. To reach this objective, more written practices are recommended by the students during the lectures in which they can be read by their classmates and the teacher as well, to be given immediate feedback. As a consequence, a task-based approach together with a content-based approach would be significant in ameliorating the computer science register and the needed English language to be qualified in the field. In regards to motivation, students wanted interactive lectures, communicative tasks and reading texts of interest which are related to their discipline.

Conclusion

The current research paper aims to uncover computer science students'demands concerning the English language. As a research procedure, a needs identification project was conducted among Master 1 computer science students to whom a questionnaire was addressed and an interview as well which was directed to both English language

teachers and subject specialist teachers. The revealing results about the target situation highlight the importance of developing computer science terminology at its linguistic levels (morphology, semantics) along with grammar. As for learning demands, respondents agree upon the reading skill development with other language skills integration to improve technical writing ability. Ultimately, the overlap between English and computer science attaches a great urge to the teaching/ learning of this 'Aladdin's lamp'language which opens the gateways to the global market and the technological advancements in the field.

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Žufková, V ; Kližanová, D ; Vivoda, M ; Kyselovic, J. (2014). The Importance of a New Concept of English Language Teaching at the Faculty of Pharmacy Depending on Compatibility with Trends in other Countries. *Educational Alternatives*, 12.

Abstract

Teaching English for specific purposes (ESP) is about defining certain goals and particular objectives to meet the specific needs of the learners. Within the same line of thought, the present study tends to explore Master 1 students'needs at Tlemcen University, Algeria for the sake of improving their computing English to write technically in the discipline. For this objective, the researcher conducted a needs analysis process made up of a questionnaire addressed to 40 computer science Master 1 students, alongside two interviews directed to 10 subject specialists, and 3 language teachers. Qualitative and quantitative analyses of data uncovered the urgent need to ameliorate the computer science terminology at various linguistic levels plus developing reading skills through a careful selection of texts according to the students'interest.

Keywords

ESP, Needs Analysis, Computing English, Technical Writing, Computer Science Master 1 Students

Résumé

Enseigner l'anglais à des fins spécifiques consiste à définir certains buts et objectifs particuliers pour répondre aux besoins spécifiques des apprenants. Dans le même ordre d'idées, la présente étude tend à explorer les besoins des étudiants de Master 1 à l'Université de Tlemcen, en Algérie, dans le but d'améliorer leur anglais informatique afin de pouvoir écrire techniquement dans la discipline. À cet effet, le chercheur a mené un processus d'analyse des besoins constitué d'un questionnaire adressé à 40 étudiants de Master 1 en informatique, ainsi que de deux entretiens dirigés vers 10 spécialistes de la matière et de 3 professeurs de langues. Les analyses qualitatives et quantitatives des données ont révélé le besoin urgent d'améliorer la

terminologie informatique à différents niveaux linguistiques et de développer les compétences en lecture grâce à une sélection minutieuse de textes en fonction des intérêts des étudiants.

Mots-clés

Anglais à des fins spécifiques, analyse des besoins, anglais informatique, expression technique, niveau Master 1

ملخص

إن تعليم اللغة الإنجليزية لأغراض خاصة يتعلق بتحديد أهداف معينة وغايات واضحة لتلبية الاحتياجات المحددة للمتعلمين. في نفس هذا السياق ، تميل الدراسة الحالية إلى استكشاف احتياجات طلاب ماجستير 1 في جامعة تلمسان، الجزائر بهدف تحسين مهاراتهم في اللغة الإنجليزية من أجل الكتابة تقنيًا في مجال التخصص. لهذا الغرض، أجرى الباحث عملية تحليل الاحتياجات تتكون من استبيان موجه إلى 04 طلاب ماجستير علوم الكمبيوتر 1، جنبا إلى جنب مع مقابلتين موجهة إلى 01 متخصصين في الموضوع، و 3 مدرسي لغة. كشفت التحليلات النوعية والكمية للبيانات عن الحاجة الملحة لتحسين مصطلحات علوم الكمبيوتر على مختلف المستويات اللغوية بالإضافة إلى تطوير مهارات القراءة من خلال اختيار دقيق للنصوص وفقًا لاهتمام الطلاب.

الكلمات المفتاحية

لأغراض خاصة اللغة الإنجليزية, حديد أهداف, طلاب ماجستير 1, الكتابة تقنيًا في مجال التخصص