An Effective Approach to Teaching English to Science-Major Students in Science Universities: Hassan II University as a Case Study

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Abstract: This paper aims to shed light on the distinct challenges that Moroccan science-major postgraduates are facing, particularly at the end of their academic year, to publish their end-of-term projects in English. The article also uncovers certain weaknesses and misconceptions concerning the existing instructional methods. As an assistant professor with substantial experience teaching science-major students, a few alternative teaching practices will be discussed and recommended in the teaching of English in Moroccan universities, instead of the overused, traditional methods. In doing so, university students were interviewed and asked to rate some of what they thought were the best activities in English classes. As regards the research methodology, surveys and interviews were conducted first hand. The questionnaires were structured in advance with students who attend English classes. Through this instrument, data was collected on the students' attitudes and their vision of the best practices in English classes, in particular when teaching English for Specific Purposes (ESP). The students showed a great preference for English for Specific Purposes over general English lessons due to the scientific nature of their studies, hence jobs. Also, because these lessons are taught at university level, the participants expressed favorable views about debates and open discussions. These and other findings aim at enriching the literature on education at tertiary levels and on the field of ESP.

Keywords: ESP, science-major students, EFL university English courses

منهج ناجح لتدريس اللغة الإنجليزية لطلاب العلوم في جامعات العلوم:
جامعة الحسن الثاني (المغرب) كحالة دراسية

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الملخص: تسعى هذه الورقة البحثية إلى تسليط الضوء على التحديات البارزة التي تواجه طلاب الدراسات العليا في الجامعة من أصحاب الاختصاصات العلمية فيما يخص نشر المقالات العلمية باللغة الإنجليزية مع نهاية كل سنة دراسية. كما أن المقال يكشف بعض نقاط الضعف والمفاهيم الخاطئة فيما يتعلق بالمنهجيات التعليمية المستخدمة. وبصفتي أستاذة مساعدة مع تجربة متراكمة في تدريس أصحاب التخصص العلمي، فسأتطرق إلى بعض البدائل في الممارسات التعليمية والتي تندرج ضمن توصيات تدريس اللغة الإنجليزية في الجامعات المغربية بدلا من المناهج التعليمية التقليدية. وفي هذا الصدد، تم استجواب عدد من طلاب الجامعات لإعطاء تقييم عن ماهية الأنشطة الأكثر فائدة في حصص اللغة الإنجليزية. وبخصوص منهجية البحث، تم إجراء المقابلات وتوزيع الاستبيانات بشكل مباشر، وقد وزعت الاستبيانات على الطلبة في صف اللغة الإنجليزية، وبواسطة هذه المنهجية، جمعنا المعطيات عن مواقف الطلبة ورؤيتهم لأفضل الطرق في تعلم اللغة الإنجليزية، ونخص بالذكر في صف اللغة الإنجليزية لأهداف محددة. وتبين من خلال هذه الدراسة أن طلبة الجامعة يفضلون دروس 'الإنجليزية لأغراض محددة ' (ESP) على الدروس العامة وهذا لطبيعة دراستهم العلمية وبالتالي الوظيفة ذات الطبيعة العلمية. ونظرا إلى أن هذه الدروس تدرس على المستوى الجامعي، فإن المشاركين الطلبة عبروا عن آراء جد

إيجابية تجاه المناقشات المفتوحة. وتهدف هذه النتائج وغيرها إلى إثراء المؤلفات في التعليم على مستوى التعليم العالي وفي مجال 'الإنجليزية لأغراض محددة ' (ESP).

الكلمات المفتاحية: اللغة الإنجليزية لأهداف محددة، الطلبة ذوي الاختصاص العلمي، صفوف اللغة الإنجليزية الجامعية

Introduction

English has become the international language for communication. In spite of being second to Mandarin, the official language in China in terms of speakers in the world, English is spoken in more countries than any other language. It has also become the international ELFA, which stands for English as a Lingua Franca in Academic Settings (Jenkins, 2014).

As English continues to dominate as the language of sciences, the need for English for Specific Purposes (ESP) was increasing rapidly, particularly in non-European countries where English is mainly used for scientific and professional purposes. People in these countries, including Morocco, learn this language in order to accomplish one of the education curriculum requirements, to attain promotional or professional development at work and to produce scientific research in English. So, instead of learning general English, it is better and it is in the students' interest to learn English on the subjects of their professional or research fields. Because of this, more and more universities all over the world have started to offer ESP classes to meet the needs of their students' future careers.

In order to be in line with these new trends, Hassan II University is following the same trend, offering English classes for science postgraduate students at the faculty of sciences. Mastering the English language is of key importance in science studies. In order to publish a research paper in well-rated, well-indexed journals, science-major students should have deep knowledge of the English language, in addition to the rigor of their research content. This is problematic for certain researchers, particularly those whose English is not their first language. Irrespective of their field, they cannot publish their content until they present it in the right format required by the journal in question, of which an academic English discourse is the prevailing feature.

Although the research task is a great pleasurable challenge for science students, writing and publishing academic content requires many efforts, particularly, for those who are not fluent in English. One cannot present research in any random, informal format; journals will simply not publish it.

This article will explore the importance of the English language for the Moroccan science-major students and will outline a few techniques that teachers of English in Moroccan universities should adopt to motivate their science-major students and help in the teaching process of English as a foreign language (EFL). This is a premise to preparing them for the next part of their academic career, which is publishing scientific research and communicating with scholars who have the same interest.

Given the importance of ESP courses in universities, this article raises certain questions regarding the application of this non-general English. Should universities in Morocco adopt ESP courses? Would

students show favorable opinions about the adoption of ESP? The article also addresses other helping teaching methods to be equipped with while teaching ESP, such as games, debates and open discussions, and new technology.

Literature Review:

A substantial review of pertinent literature on English for Specific Purposes (ESP), its advent, and its practical use and usability exist abundantly. The term ESP, hence use thereof, arose in the 1960s following the increasing need for English in a variety of contexts. This was a subsequent reaction to the ineffectiveness of general English classes for learners in professional settings. According to Robinson (1989), English for Specific Purposes refers to teaching or studying English for a particular profession or sciences, law, business activity, etc. There are specific reasons behind the learning of English For Specific Purposes. Robinson (1989) describes ESP as a type of English language teaching and defines it as "goal oriented language learning" (p. 398). This implies that the learner has a specific goal that is going to be accomplished.

The specific goals are inextricably linked with the learners' interest in several disciplines or in the university they are enrolled in. Learners can learn English for a specific purpose, which corresponds to their chosen interest or discipline. Therefore, students learn English not only because they are interested in the English language but also because they have to accomplish a task in English. Their know-how in the English language must be in such an adequate level that they can communicate and generally perform well in their major field of studies.

In their paper, Hutchinson and Waters (1987) surveyed three factors leading to the emergence of ESP in the late 1960s, both theoretical and practical, which have shaped its subsequent development. Similarly to any development in human activity, it is noted that ESP was not planned but represented a phenomenon resulting from a number of converging trends, many of which have operated in several ways. Two reasons behind the emergence of ESP can be identified: universal and local reasons.

On the international scale: The increasing demand for a more detailed language

The end of the Second World War was marked by an enormous and unprecedented expansion in scientific, technical and economic activity on the international scale. As a result of that, English became the accepted international language of technology and commerce, or as put by other researchers, the lingua franca for academia, science, and technology (Björkman, 2013). Others have put forth that English will remain prevalent as the most spoken language for long before any other language takes over (Ostler, 2010). The language also drew the interest of a new generation of learners, who were cognizant of the specific reasons behind learning it: mechanics who had to read instruction manuals; doctors who needed to keep up with developments in their field; businessmen who wanted to sell their products; and a whole range of students whose course of study consisted of materials available in English only, all of which

strengthened the urgent need for ESP. However, the accelerated development of ESP can mainly be ascribed to the early 1970s oil crises, which resulted in a massive flow of funds and western expertise into the oil-rich countries. On the advent and rising development of ESP, Hutchinson & Waters (2010) state:

The general effect of all this development was to exert pressure on the language teaching profession to deliver the required goods. Whereas English had decided its own destiny, it now became subject to the wishes, needs and demands of people of the other language teachers. (p. 7)

Use of ESP in Moroccan universities of science: Ben Msik Faculty, Hassan II Univesity as an example

In 2013 Moroccan universities accommodated a few reforms, one of which was the cancellation of English from the undergraduate studies syllabus, particularly Bachelor of Science and Professional Bachelor. The reform sought to comply with international higher education standards. A few years later, English was re-integrated into the science syllabus at the Hassan II University, following the concerted efforts made of Dean Mohammed Talbi. The decision to re-incorporate the English module in the postgraduate program——MA program—— was aimed at promoting a more tailored learning fashion to fit into, and complement, the program's needs and expectations and to consolidate students' English skills. Based on observations during the teaching of ESP to Master's students in the academic year of 2015-2016, learners in Moroccan science universities seemed to face difficulties in productive skills, i.e. writing and speaking, with a proficiency level of A1-B1, according to Common European Framework of Reference.

A typical English lesson at a Moroccan university of science usually entails exposing the students to short extracts from a general English textbook or from EFL websites that offer a variety of well-structured lessons like Breaking News English[1] (Boulahnane & Abramova, 2019). The instructor assigns a silent reading activity for a few minutes before one of the students reads the text aloud to help check students' pronunciation. Following pronunciation correction, a discussion of the text takes place, during which the instructor evaluates the students' understanding of both text content and the existing lexicon. The subsequent stage is characterized by a smooth shift to grammar and language structure. The lesson ends with a writing assignment, in which the students are expected to present a briefing or summary of the text in question.

The prevailing level in the classroom is mostly heterogeneous, leading to some students feeling bored, others demotivated and uninterested. Additionally, the number of English classes scheduled for the Master's groups within one semester seems insufficient; postgraduate students are expected to produce an end-of-term project in English by the end of the academic year, attend scientific conferences, and present presentations in English.

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(1) Boulahnane & Abramova (2019) describe the educational news website materials and how teachers can provide structured lessons from it.

The classical teaching method might fit those interested in learning general English and whose primary goal is to be able to read, speak, and understand regular English. However, adopting this method would probably only lead to students' learning rudimentary reading skills and acquiring intermediate-level vocabulary with a limited set of writing skills. While these skills are still of key importance, they remain a tiny part of the whole and reflect the urgent need for ESP——what science-major students need to consolidate their technical field. After graduation, some students enroll in university departments as part-time teaching assistants, wherein they are required to lecture either in French or in English. Part of their academic activities entail participating in national and international conferences, seminars, and symposiums wherein they resort to spoken scientific discourse to skillfully present academic papers or research findings in front of an audience. Working for Moroccan National or Multi-national companies such as Dell, CPC international, Crown Cork and Seal Company, Maya Gold & Silver and others necessitates from Moroccan graduates the skill of verbally reporting technical problems on the work ground, discussing the progress of a project with the manager, exposing the financial status of the company in an official meeting, etc.

In a general English course, our conception and use of the English language are limited to printed text from textbooks and websites. These teaching materials represent the backbone of our instruction and at times the only means of presenting an English lesson. However, reading digital scientific texts, including audio-recordings and documentary videos, can be a very promising and rewarding material that offers an alternative way of acquiring scientific literacy in English. Science-major students are more likely to display confidence in using scientific discourse in professional and non-professional situations if trained to critically read and deconstruct spoken and written scientific discourse. Therefore, it is advisable to encourage them to listen to scientific English audio tracks as an example. A pedagogy that relies solely on reading materials and a little writing practice is not effective. As an assistant professor, I believe that a skillful amalgamation of the four language skills——reading, writing, listening, and speaking——is of paramount importance if we are to harvest the utmost benefit from the English classes we provide.

The relevance of the study

Teaching English in science universities with reference to Hassan II University of science.

Being the prevalent language of sciences makes it both a must and a necessity for Moroccan university science-major students to seek a certain level of proficiency in scientific English if they are to achieve effective communicative skills and competencies that respond to international standards. As a university assistant professor of English in a Moroccan faculty of sciences, I suggest an effective approach in teaching English as a foreign language in the present paper, which urges both an amendment and an enrichment of the existing pedagogies in teaching English for Moroccan university science-major students. This paper both unveils certain weaknesses, gaps, and misconceptions concerning the existing

instructional methods and offers key considerations in the preparation of a challenging and engaging scientific English course. It is highly recommended to revisit ESP pedagogies when teaching science-major students. There is a dire need for a remedy for the insufficiently structured courses by designing a well-woven syllabus based on pedagogical and practical considerations that meet students' learning necessities and needs.

Limiting the course agenda to the reading of printed texts of general English and the writing of relevant summaries is impractical in students' linguistic performance. Instead, integrating the four language skills—namely, reading, writing, listening, and speaking—maximizes their learning and engagement processes. Incorporating students' mini-lectures, role-plays, Windows Live Movie Maker video projects, documentaries, recorded lectures, guest speakers, and field trips into the course has proven very rewarding. Similarly, organizing workshops that help students produce scientific texts themselves, interpret medical leaflets, posters and brochures, break class routine, and the classical activity of summarizing texts.

One more relevant reason behind the study is that ESP represents the necessities and requirements needed upon finishing university years. The job market requires people who can communicate using the specific jargon, away from general, day-to-day English. Science-major students expect jobs in the technical field, such as laboratories for physics/chemistry students; accounting for mathematics students; geology for science students, etc. The need for ESP is urgent and not only a matter of choice.

The objectives

Following the relevance of this study, this article presents a few teaching approaches and pedagogies recommended by science-major students in Moroccan universities of science. The opinions have been elicited through a questionnaire to offer a vivid image of what the respondents wish to be part of the syllabus. The article therefore seeks to shed light on some of the students' priorities and preferences as regards English as a foreign language, and in what way they would like to be taught this English—General or technical.

THE METHODOLOGY

Data Collection

To collect data, a questionnaire of five main questions was adopted as the main method in this article. The questionnaire addressed university science-major students with the aim of eliciting their perceptions as to what they think make the best practices in ESP courses and whether a technology-supported learning environment would be substantial a contribution in ESP teaching. With the questionnaire used as a data-collecting instrument, the study sought to measure the level of manifestation

of good teaching practices and the level of students' satisfaction with these practices. Their responses were listed in the tables below and then discussed in the discussion section. The interpretation and discussion of the results are presented in the subsequent part. After asking respondents to express their views concerning the best ESP practices in the classroom, their expectations and perceptions of positive or negative practices are reported and discussed in light of a few previously published studies in the same vein.

Sampling

As a sample for the study, Hassan II University students in the academic year of 2016-2017 were the target group. Totaling 160, postgraduate majors of health sciences, biology, renewable energy, and environment science constituted the sample chosen for the study. The questionnaire was designed to be both quantitative and qualitative, in which the respondents were asked close-ended questions and the researcher had the possibility to intervene to elicit more data about the best ESP practices. The questions addressed in this questionnaire included the incorporation of games in ESP learning and whether they correlate with a successful teaching method. Other questions included introducing debates and discussions for students to recycle their vocabulary and express their opinions on an intermediate-advanced level, which is expressed as B1-C1, which corresponds to two levels on the assessment chart accredited and adopted by the Common European Framework of Reference. Oral presentations and use of new technology have also been included.

Results and Discussion

Question 1

Table (1) Q1: Do you agree or disagree with the integration of new technology in English classes?

Integration of new technology in English classes	
Agreed	Disagreed
75%	13%

As shown in table 1, Out of 160 respondents, 75% showed favorable attitudes towards the integration of new technology in English classes (n=120). When asked to justify their responses, the respondents also showed positive views of planned lessons—as opposed to unplanned lessons—and the learning process with an ESP technology-supported learning environment. They also appreciated the communication skills of the teacher as one of their best qualities. As regards the respondents with negative views towards new technology (n=21), most of them expressed concerns regarding the lack of time to practice more reading and writing activities, which are key in producing scientific papers by the end of the academic year. A total of 19 respondents—constituting 12% of the sample— were not able to answer the questions.

On the effectiveness of technology-supported teaching, Richardson (2004) states that teachers are to:

Incorporate technology as seamlessly as possible. The technology is the means, not the content of the presentation. It should not overwhelm the lesson, but enhance it. If a non-technology-based means of presentation would be more effective, then by all means use it. The simplest, most intriguing tool to impart instruction is the best tool. Paper and pencil can sometimes be more effective than computer equipment - and paper does not crash! (p. 14).

Question 2:

Table (2) Attitudes towards debates and open discussions in the classroom

Attitudes towards debates and open discussions	
Favorable	Unfavorable
91%	8%

When asked about debates and open discussions in the classroom and how these activities pertain to their needs, 91% of the respondents expressed favorable attitudes against only 8%. The respondents said the inclusion of debates encouraged horizontal interaction amongst the students, helped them review and recycle the learned vocabulary and develop speaking fluency in English, helped develop arguments for any given topic, and increased their confidence and self-esteem in the classroom.

Regarding the respondents who expressed negative views of debates and open discussions (8%), they supported their views with the following reasons: not desirable for every student due to the strongest ones self-imposing or monitoring the discussion; some students are offended when their opinions are challenged, leading to heated side talks amongst the students. A total of 3 respondents (2%) were not able to answer the questions.

Question 3

Table (3) Use of games in ESP teaching

Attitudes towards adopting games in ESP teaching	
Favorable	Unfavorable
88%	8%

Based on the findings shown in table 3,88% (n=140) responded positively to the inclusion of games activities in ESP teaching against 8%. When asked to further explain, the respondents said games add fun to learning and help retain vocabulary better. Additionally, with games included in the lessons, the classroom turns into a friendly learning environment thanks to interaction—both vertical and horizontal. Those who disagreed expressed that games are time-consuming at times, leading to uncontrollable activities. Only 4% of the respondents did not respond to this question.

It is worthy to note that routine exercises can only check the students' memorization capacity of English terminology through traditional instruction—e.g. filling the gap and other similar exercises.

In this context, Ria (2016) states:

[the study] indicated that students got significant achievement in learning vocabulary used English computer game as interactive material. Before students learnt English from the English computer game, their score was not good enough but since they learn vocabulary from the English computer game, their score was increased effectively. It was also strengthened by the result of the interview which concluded that students like learning through this interactive material. Finally, I recommended an English computer game as interactive materials for learning vocabulary. (p. 147)

With a game-incorporated lesson, students seem to learn better and more quickly while having fun. Learning and having fun are possible through the integration of language games such as Last Man Standing, Pictionary, Charades, Taboo Word, Letter Scramble, What am I thinking of?, Word Bingo, and others. These suggestions are only a few amongst a myriad of others used for a less monotonous, more creative learning environment.

Question 4:

Table (4) Which do you prefer, general English or ESP?

ESP lessons or General English lessons	
ESP lessons	General English lessons
94%	4%

Most of the respondents (94%) showed a great preference for ESP classes over general English classes, stating that ESP is associated with high levels of motivation, interest, curiosity, and involvement. They further expressed great interest in scientific English courses for the technical lessons needed in their future careers. Those who could not respond to the question were as insignificant as 4%.

Question 5:

Table (5) How important are oral presentations in ESP classes?

Oral Presentation	
Favorable	Unfavorable
64%	36%

As regards oral presentations, 64% of the respondents (n=90) expressed positive attitudes, showing a preference for talking in front of an audience, given its challenging nature. The other 36% disapproved of the necessity of oral presentations in ESP classes, stating two reasons: presentations are time-consuming and are only meant for advanced levels.

Referring back to the collected data, it is concluded that university science-major students perceive the aforementioned teaching practices very positively. The findings were mostly favorable, implying students' satisfaction of ESP teaching practices stated in the article. Incorporating new technology and other creative approaches in teaching English in Moroccan science universities may make use of a myriad of classroom activities and assignments beyond routine reading and writing activities.

Conclusion

The results show an urgent need to revisit the teaching approaches and pedagogies adopted in teaching English to science-major students in Moroccan universities of science. It is now urgently advised to offer more structured English courses designed and planned based on certain distinct considerations that meet the science-major students' learning necessities and needs, particularly what awaits them in the job market. Limiting the course agenda to the reading of printed texts and the writing of relevant summaries does not serve the students' goals. Instead, integrating the four language skills would maximize their learning and engagement alike. As an assistant professor having designed and taught English lessons to university science-major students, I consider the approach discussed in the discussion section to be praiseworthy for its efficiency and fruitfulness in ESP teaching. Student's texts, exams, projects, classroom participation, vocabulary retention, understanding of scientific notions, motivation and engagement during the flow of the course were exceptionally awe-inspiring.

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