

# FROM NEEDS ANALYSIS TO COURSE EVALUATION: A CASE STUDY OF AN ESP COURSE

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## ABSTRACT

Needs analysis is often referred to as one of the essential parts during the period of course design. This study, choosing a skilled-centred ESP course Nuclear Science English as the research object, aims to conduct needs analysis and course evaluation. It is founded that although target needs are very clear, many students still lack motivation to learn it, for the course itself fails to satisfy learners' subjective needs. In terms of course evaluation, this ESP course is with professional teaching materials, various teaching methodology and multidimensional evaluation system. However, it is difficult for English majors to finish the course since the course designer ignores English majors' weak learning foundation of natural science.

**Keywords:** Nuclear Science English, English Majors, Course Evaluation, Needs Analysis

## 1. INTRODUCTION

*Nuclear Science English* is a compulsory course of school of foreign studies in Harbin Engineering University, for nuclear science and technology is one of the core disciplines in the university. In order to make students learn knowledge of nuclear science and acquire relevant reading and translation skills, this ESP course is designed by means of the skill-centred approach. This study aims to analyze an ESP course called *Nuclear Science English* for English majors from the perspective of needs analysis and course evaluation. The study encompasses six parts: introduction, literature review, needs analysis, course evaluation, discussion as well as conclusion.

## 2. LITERATURE REVIEW

### 2.1. OVERVIEW OF NEEDS ANALYSIS IN ESP

Needs analysis is usually regarded as the first step in the development of ESP courses [Flowerdew \(2013\)](#). Curriculum development of English for specific purpose is guided by learner needs as the identifiable elements of students' target English situations [Johns and Dudley-Evans \(1991\)](#). [Benesch \(1996\)](#) viewed needs analysis as a relatively-subjective process, considering that critical needs analysis was important.

A great number of research on needs analyses in ESP previously concentrated on the general language skills [Johns \(1981\)](#); [Ostler \(1980\)](#) and academic literacy skills [Leki and Carson \(1994\)](#); [Horowitz \(1986\)](#). However, there are many scholars focusing on conducting needs analysis oriented towards the specific context in recent years. [Cowling \(2007\)](#) dissected the stage of needs analysis in the development of English language intensive courses at a big Japanese industrial company, finding that much thought and care was required during the planning and execution stages. [Smith et al. \(2022\)](#) demonstrated how methodological innovative recommendations for implementing reliable and valid NA could inform EAP program evaluation. Giving an ethnographic discourse analytical description of role-play conversations collected from 100 college nursing students in China, [Huang and Yu \(2023\)](#) conducted a needs analysis grounded in students' communicative behaviours in performing nursing tasks, pointing out that students relied on prescribed phraseology and struggled to adjust their nursing plan based on differing patient needs.

### 2.2. OVERVIEW OF COURSE DESIGN

Based on the cognition of Tom [Hutchinson and Waters \(2002\)](#), course design can be viewed as the process by which the raw data about a learning need is interpreted in order to produce an integrated series of teaching-learning experiences, whose ultimate goal is to lead the learners to a particular state of knowledge. Course design itself is a general concept, and there are probably as many different approaches to ESP course design as there are course designers. Three basic main types of course design are language-centred approach, skill-centred approach and learning-centred approach.

As a widely accepted approach, the skill-centred course design, compared with language-centred approach, is more realistic in concentrating on strategies and process of making students aware of their own abilities as well as potential, and motivating them to tackle target texts on their own after the end of the course [McDonough \(1984\)](#), so that they can continue to improve. The aim of the skill-centred model is not to provide a specified corpus of linguistic knowledge but to make the learners into better processors of information so that the learners are able to dispose of the task within the specific limit.

## 3. NEEDS ANALYSIS

In a general sense, the course design starts with the question why learners need to learn the course. Hence, the role of needs analysis in the skill-centred approach is very important. Based on the model of needs analysis propounded by Tom [Hutchinson and Waters \(2002\)](#) this study delves into target needs and learning needs. Target needs mean what the learner needs to do in the target situation, while

learning needs mean what the learner needs to do in order to learn. The following part focuses on specific needs oriented towards the course *Nuclear Science English*.

### **3.1. TARGET NEEDS**

#### **3.1.1. WHY IS THE LANGUAGE NEEDED**

English majors learn nuclear science English not for study or training but for translation work in the future. Nuclear science English, as part of English for science and technology, has its own features. Some terminologies and sentence structures are distinct from what students have already learn so that it is difficult for us to dispose of some tasks with our existing experience. In addition, absolute accuracy must be ensured in our translation because any subtle mistakes may mislead researchers into making wrong decisions. Therefore, learners must be attentive to details in the process of learning nuclear science English.

#### **3.1.2. HOW WILL THE LANGUAGE BE USED**

Nuclear science English is a kind of marginalized language in our daily use, so the main medium of it does not include listening, speaking and writing. It is also apparent that students probably do not talk about it face to face or on telephone. For English majors, it mostly appears in reading and translation in certain books or files. If students hope to probe into this field, they will need to concentrate on certain types of text or discourse such as technical manuals and science lectures.

#### **3.1.3. WHAT WILL THE CONTENT AREAS BE**

The subject of the course is nuclear science, whose branches such as nuclear energy, nuclear radiation, nuclear fuel and nuclear accelerator are also included in the course syllabus. Besides, some basic concepts including isotopes, mass defect, binding energy as well as fission are explained before knowledge of nuclear science is imparted so that learners can better understand the targeted information in the process of learning nuclear science English.

#### **3.1.4. WHO WILL THE LEARNERS USE THE LANGUAGE WITH**

In a general sense, the group of people who often have preference for using highly specialized nuclear science English is very limited. Hence, English majors can have the opportunity to use it with scientists, technicians and students, whose level of knowledge is relatively high. Since it is a universally technical language in the field of nuclear science around the world, students can use it with both native speakers and non-native speakers. In terms of relationships, students can use it with colleagues, teachers, superiors, subordinates and so on.

#### **3.1.5. WHERE WILL THE LANGUAGE BE USED**

In terms of physical settings, students can use nuclear science English in the workshop, office, factory, laboratory and library. In terms of human contexts, it appears in some meetings and some lectures. In terms of linguistic contexts, no matter whether students are in our own country or at abroad, they have the chance to use it.

### **3.1.6. WHEN WILL THE LANGUAGE BE USED**

Nuclear science English is used concurrently with the course. It is used frequently in class but seldom after class, for English majors do not encounter any situations where this kind of language can be used at all after class.

## **3.2. LEARNING NEEDS**

### **3.2.1. WHY ARE THE LEARNERS TAKING THE COURSE**

*Nuclear Science English* is a compulsory course of school of foreign studies in Harbin Engineering University, for nuclear science and technology is one of the core disciplines in our university. Therefore, English majors have to choose it for graduation. I firmly believe that most students do not have too much interest in this course not only because they do not feel the apparent needs to learn it but also because the benefit they reap is not as much as the time they spent. Therefore, many students have negative attitudes towards this course.

### **3.2.2. HOW DO THE LEARNERS LEARN**

The course is prepared for grade three students, who have relatively good abilities to read, write and translate. At the same time, they are able to adopt effective strategies to acquire knowledge of foreign language. Most students prefer the course with flexible styles, less likely to admire teachers who only read PPT.

### **3.2.3. WHAT RESOURCES ARE AVAILABLE**

First, it is relatively easy for students to get some learning materials of nuclear science English. Some free websites provide many terminologies with explanations, and large amounts of English books about nuclear science in the library are available at any time. Second, the teacher has taught English majors nuclear science English for more than 10 years with sufficient knowledge, warm personality and high enthusiasm. The teacher is able to assist us to solve the problem with patience when students are confronted with some intractable problems related to nuclear science and translation strategies. However, there are not many out-of-class activities of using nuclear science English except a seven-day placement in Grade Four.

### **3.2.4. WHO ARE THE LEARNERS**

Although learners, aged 19-21, have acquired some professional knowledge of English, such as literature, linguistics and translation, they have not yet reached the point of proficiency. In addition, almost all learners know little about nuclear science because English majors are all students of liberal arts who do not learn much knowledge of physics, chemistry and biology. Therefore, a prevalent feeling of fear for nuclear science exists among English majors.

### **3.2.5. WHERE WILL THE ESP COURSE TAKE PLACE**

Students attend the class in a very quiet computer-aided translation room where multimedia devices, translation software as well as the water cooler are all equipped, which means that it is a great place for students to learn.

## **4. COURSE EVALUATION**

### **4.1. TEACHING MATERIALS**

Since this ESP course is designed for English majors, who do not have much knowledge of natural sciences, the textbook should be chosen with great care. The textbook chosen for this course is called *Nuclear Science English* Yan (2016), which is a book with a combination of common sense and specialized knowledge. The contents of the book are from easy to difficult and from basic to specialized. Each unit is relatively independent so that the teacher can select some units to teach according to the actual teaching needs. The book covers the main subdisciplines of nuclear engineering, including basic knowledge of nuclear reactors, power systems of nuclear power plant as well as nuclear safety. In addition, the contents of the book are selected from original English textbooks and design manuals in order to ensure the authenticity of language and materials.

Every unit is organized by a set pattern of components. In terms of macro-skills, the teaching material is intended for reading and translation. Hence, in each unit, the article with notes appears first, followed by two or three translation exercises. In terms of language points, large amounts of terminologies of nuclear science are listed in the book.

### **4.2. TEACHING METHODOLOGY**

The teacher adopts a cognitive approach in the course. The teacher does not think of students as passive receivers of information but views students as active processors of information. In class, the teacher requires students to finish reading with some questions put forward. After reading and answering questions, the teacher will ask students whether they can imagine what the devices look like or how the equipment works. Then the teacher plays the video or shows us some pictures in order to make students further understand what it is.

The teacher pays much attention to variety in the process of teaching. First, in terms of variety of medium, texts, pictures and video appear in class. Second, students have individual work, group work or the whole class work, which means the way of classroom organization is diverse. Third, varieties of skills including reading, translation and speaking are practiced in class.

Apart from variety, the teacher also lay emphasis on students' involvement. the teacher is inclined to ask questions, but seldom asks questions that are too difficult to answer so that students are willing to answer them. Even if posing a challenging question and the student answers it incorrectly, the teacher still encourages him or her, which makes students think their involvement is of value. In addition, students are required to do presentation to show their cognition of nuclear science. What's more, students are also evaluators. They have the opportunity to evaluate themselves and evaluate others in class.

### **4.3. EVALUATION SYSTEM**

The evaluation system of this course is multi-dimensional. It includes three parts: involvement, homework, and final test. The proportion of the three is 30%, 30%, 40% respectively, and the evaluation is mainly process-oriented.

First, in terms of involvement, students are required to attend class on time, actively engage in discussions and do high-quality presentations. Second, homework is another important part of evaluation, which consists of analysis and

translation. The homework “analysis” is a nightmare because students are required to describe a principle of nuclear reaction and then analyse its application. Students can choose what they need to analyse from 10 items given by the teacher. The second homework is translation. Students need to translate an article with 3000 English words. Third, final test is composed of reading and translation. All materials existing in final test are about nuclear science.

## **5. DISCUSSION**

### **5.1. MERITS OF THE COURSE**

To begin with, objective necessities and lacks are taken into consideration. Although more and more people in China are proficient in English, the current situation is that there is still a desperate shortage of translators of high ability for nuclear science. Therefore, a person who masters nuclear science English can make great contribution to the development of our country.

In addition, the contents of the course are comprehensive. First, the instructor teaches learners many features of English for science and technology such as nominalization, passive voice and complex sentences, which are very helpful for them to know how to do translation related to science and technology. Second, learners can broaden their horizons by learning some knowledge of nuclear science. Third, three macro-skills including reading, speaking and translation are included in the course.

What's more, the teaching methodology is various. The teacher organizes group work and the whole class work in order to cultivate students' ability of cooperation and make students actively engage in discussions. Besides, every student is required to do presentation. This is an effective way that students can understand how the equipment works more clearly.

Last but not least, the evaluation system is multi-dimensional and it is mainly process-oriented. Involvement in class and practice after class is tightly combined. Final test is also important because it can reflect students' real ability to read and translate in an objective way.

### **5.2. DRAWBACKS OF THE COURSE**

First, subjective necessities, lacks and wants of students are ignored. Few English majors are inclined to do work related to nuclear science after graduation. Therefore, most students are not willing to spend too much time learning nuclear science English because they do not need it.

Second, something in the coursebook is not suitable for English majors. In the textbook, there exists large amounts of terminologies and high-specialized articles, which English majors do not understand at all even if the teacher explain them in detail. Besides, some exercises such as the identification of different concepts are not designed for English majors but oriented towards students majoring in nuclear science and technology, which to some extent leads to a phenomenon that learners' enthusiasm for learning English gradually wanes.

## **6. CONCLUSION**

To conclude, the ESP course *Nuclear Science English* is designed by means of the skill-centred approach because elements in this course mainly aim to enhance students' capability of reading and translation in English for science and technology.



However, although the teacher pays much attention to variety in the process of teaching and designs the multi-dimensional evaluation system, many students still lack motivation to learn it, for the course itself fails to satisfy learners' subjective needs. Therefore, the suggestion is that the course should change into an optional one so that students can choose it based on their own interest and needs.

### CONFLICT OF INTERESTS

None.

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### REFERENCES

- Benesch, S. (1996). Needs Analysis and Curriculum Development in EAP: An Example of a Critical Approach. *TESOL Quarterly*, 30(4), 723-738. <https://doi.org/10.2307/3587931>
- Cowling, J. D. (2007). Needs Analysis: Planning a Syllabus for a Series of Intensive Workplace Courses at a Leading Japanese Company. *English for Specific Purposes*, 26(4), 426-442. <https://doi.org/10.1016/j.esp.2006.10.003>
- Horowitz, D. M. (1986). What Professors Actually Require: Academic Tasks for the ESL Classroom. *TESOL Quarterly*, 20(3), 445-462. <https://doi.org/10.2307/3586294>
- Huang, Q., & Yu, Q. J. (2023). Towards a Communication-Focused ESP Course for Nursing Students in Building Partnership with Patients: A needs analysis. *English for Specific Purposes*, 70, 57-69. <https://doi.org/10.1016/j.esp.2022.11.006>
- Hutchinson, T., & Waters, A. (2002). *English for Specific Purposes : A Learning-Centred Approach*. Shanghai : Shanghai Foreign Language Education Press.
- Johns, A. M. (1981). Necessary English: A Faculty Survey. *TESOL Quarterly*, 15(1), 51-57. <https://doi.org/10.2307/3586373>
- Johns, A. M., & Dudley-Evans, T. (1991). English for Specific Purposes: International in Scope, Specific in Purpose. *TESOL Quarterly*, 25(2), 297-314. <https://doi.org/10.2307/3587465>
- Leki, I., & Carson, J. G. (1994). Students' Perceptions of EAP Writing Instruction and Writing Needs Across the Disciplines. *TESOL Quarterly*, 28(1), 81-101. <https://doi.org/10.2307/3587199>
- McDonough, J. (1984). *ESP in Perspective: A Practical Guide*. London : Collins ELT.
- Yan, Qi. (2016). *Nuclear Science English*. Beijing: China Electric Power Press. <https://doi.org/10.1016/j.nucengdes.2016.02.023>
- Ostler, S. E. (1980). A Survey of Academic Needs for Advanced ESL. *TESOL Quarterly*, 489-502. <https://doi.org/10.2307/3586237>
- Smith, G. F., Jung, H., & Zenker, F. (2022). From Task-Based Needs Analysis to Curriculum Evaluation: Putting Methodological Innovations to the Test in an English for Academic Purposes Program. *English for Specific Purposes*, 66, 80-93. <https://doi.org/10.1016/j.esp.2022.01.001>