

## DEVELOPING AN ENGLISH TEXTBOOK FOR STUDENTS OF COMPUTER SCIENCE

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### ABSTRACT

*The purpose of this research is to develop an English textbook for students of computer science. This research used ADDIE (Analyze, Design, Develop, Implement, Evaluate). The researchers followed the five steps of the research procedure to produce an English textbook. Students and lecturers were involved in this research. The materials in the book were based on students' needs and have been validated by the computer science lecturers. The product has also accommodated the four basic skills and can be used as a self-study book.*

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## 1. Introduction

The development of production technology in the industry that affects work, lifestyle, and life has changed from time to time since the 18th century. It started with industry 1.0 at the end of the 18th century where the production process was carried out mechanically. With the start of the use of steam engines in producing goods, there was a significant increase in production so that industrial culture began to be oriented towards production scale, efficiency, and quality (Thangaraj and Ramya, 2018). Industry 2.0 began at the beginning of the 20th century with the development of machines that run on electricity that are more efficient in operation and maintenance and are able to produce goods massively and quickly (Yin et al. 2018). Furthermore, the use of computers and information technology in the 1970s marked the start of industry 3.0 which further accelerates the automation process in production activities and reduces production costs (Nakayama et al. 2020). Entering industry 4.0, the application of communication and information technology has become a fundamental need in digital-based production and has transformed the way humans work, live, and interact with one another (Asghar et al. 2020).

In industry 4.0 where the world globally is entering a new phase in the industrial revolution that focuses on connectivity, automation, digital technology, and real-time data,

English plays an important role in life. Not only as a medium of communication in the fields of business and academia but the internet of things (IoT) in this digital era also makes English a medium used to communicate globally. English is also needed in adapting education to industry 4.0 because the technology applied in education uses English.

The rapid development of technology and science no longer only relies on conventional general English learning, but there is a need for mastery of English in certain fields specifically or known as English for Specific Purposes (ESP). The demand for mastery of English in certain occupations or professions makes the need for ESP learning increasingly escalate today.

ESP is an approach in learning English that is based on the needs of learners that is directed to specific goals in a particular field (Hutchinson and Waters, 1987). More specifically, Dudley-Evans and St. John (1998) added that ESP is made to meet the specific goals that students need. Strevans (1988) distinguishes between absolute characteristics and variable characteristics in ESP, as follows;

Absolute Characteristics include:

ESP is an English language learning that:

- 1) Designed to meet the needs of learners;
- 2) Learning content (eg themes and topics) focuses on a particular discipline or occupation;
- 3) Mastery of skills in the field of grammar related to certain disciplines;
- 4) Different from general English.

Variable characteristics include:

ESPs can have the following criteria, although they are not the case:

- 1) Limited in the aspect of language skills learned (reading only)
- 2) Not taught based on a predetermined method.

English for Specific Purposes which are designed for certain disciplines provides added value for students. Specifically, the benefits of ESP as quoted from Wright (in Tahir, 2009) are as follows:

- 1) *Learning speed*. Learners can understand aspects of language relatively quickly because they learn the material they need according to the contexts they encounter every day;
- 2) *Learning efficiency*. Learners use specific learning resources and according to their needs to the fullest;
- 3) *Learning effectiveness*. After learning is complete, students are ready to use English properly and correctly according to their profession.

There are so many benefits from implementing ESP learning that ESP is set to be a compulsory subject in several faculties at Jambi University. One of the faculties that require ESP

is the Faculty of Science and Technology. All study programs at this faculty integrate ESP called 'English II' into their curriculum. One of the study programs that have high attention to the application of ESP for students is the Information Systems Study Program.

Graduates of the Information Systems Study Program have very varied opportunities and job opportunities and require English language skills, especially English in the field of Information Systems. In addition, the programming language that is identical to the Study Program is entirely in English. Therefore, ESP for Information Systems Study Program is very necessary to develop students' abilities specifically in their fields. Students can read information from sources to update knowledge about the latest discoveries and developments in the relatively dynamic field of Information Systems, they can participate in workshops or international conferences to enrich their knowledge, and so on.

With English language skills in the field of Information Systems, graduates of this study program can implement it in the world of work and benefit the company or where they work later. Specific English language skills in the field of Information Systems can increase productivity which in turn has a positive impact on society.

The ideal conditions described above can be achieved with adequate learning and learning facilities and infrastructure. So far, there are no available teaching materials in the form of English for Specific Purposes learning resource book for Information Systems students.

### **Definition of English for Specific Purposes**

English for Specific Purposes (ESP) is a subject that teaches specific English skills needed by certain learners for certain purposes. The content of this subject contains abilities related to the students' professions (Day and Krzanowski, 2011). ESP includes text analysis and the use of language needed by students in their work (Basturkmen, 2010). A similar opinion was also conveyed by Anthony (2018, p10):

English for Specific Purposes (ESP) is an approach to language teaching that targets the current and/or future academic or occupational needs of learners, focuses on the necessary language, genres, and skills to address these needs, and assists learners in meeting these needs through the use of general and/or discipline-specific teaching materials and methods.

According to Hutchinson and Waters (1987), ESP is not a product, but a language learning approach to meet the needs of students, where the materials and methods used are based on the reasons why students choose to study ESP. Hutchinson and Waters (1987) added that the current ESP does not emphasize too much on 'how' students learn, but is more oriented to 'what' is learned by students, which uses a language-centered approach. With this approach, ESP teaches language skills according to the needs of learners.

ESP is considered more effective than general English because ESP is detailed to meet the needs of students so that they are relatively high-spirited to study topics and texts related to their field of interest. Conditions, where students have high motivation to learn, can make the learning and learning process more effective. In addition, ESP is more efficient because the learning objectives are more specific about the desired goals and because ESP is made based on an analysis of student needs.

### **Design English for Specific Purposes**

The latest research in the field of English for Specific Purposes is concentrated on improving professional language skills that integrate scientific disciplines and professional practice in complex and dynamic social situations where communication in English takes place in real-time in the field. The application of ESP is integrated and cannot be separated from the ESP design variables. In designing an ESP, 4 important things must be considered.

### **Need Analysis**

*Need analysis*(needs analysis) is the first step in designing an ESP. This analysis is carried out systematically about what is needed by students. This activity can be carried out by providing questionnaires to stakeholders in collaboration with administrative staff and colleagues. This questionnaire is comprehensive and includes relevant details about the targets to be achieved by students, as well as what students need and want (Day and Krzanowski, 2011). Need analysis is done to find out what is needed and how it is realized. Chambers (1980) calls it a target situation analysis. Questions about needs, current deficiencies, desired targets, and the environment in which the learning will take place are important things to know before starting the ESP design. If the need analysis is done correctly, the quality of ESP learning will be satisfactory for students.

### **Learning Objectives**

After analyzing the needs of students, it is necessary to determine learning objectives (learning objectives). The purpose of learning is not only in the aspect of language, text genre, and the skills to be mastered. It is also necessary to determine the learning and learning strategies that will be applied in the classroom. After determining the learning objectives, these goals need to be arranged systematically, clearly, logically, and attractively for students.

### **Materials**

The next stage is to prepare teaching materials that can be obtained from published or unpublished literature, from students, from teachers, from linguists, ESP experts, and triangulated sources (Long, 2005). If students have special needs that cannot be met using one

sourcebook, it is necessary to mix and match material from several sources using a blended learning platform (Day and Krzanowski, 2011).

### **Evaluation**

ESP evaluation is not much different from other learning evaluations. Two types of evaluation that must be carried out are student evaluation and evaluation of the implementation of the teaching and learning process. Student evaluation is carried out to see the performance of students in exams, how far students can improve their abilities as a result of learning. The success of ESP can be seen from how many students attend lectures and how many can complete them and how the average score is. The second evaluation was carried out on the teaching and learning activities of ESP itself and the quality of instruction. The information needed is about students' perceptions of ESP lectures, whether they get the benefits, do they enjoy learning activities, whether they are motivated to learn again, do they think the lectures are too short or too long, do they think there are language skills that have not been taught in lectures, and so on. This information was obtained from a specially designed questionnaire.

### **Preliminary studies**

Many preliminary studies on the application of English Specific Purposes have been carried out. Hsu (2014) examined the effectiveness of English for Specific Purposes lectures in the field of hospitality and tourism at universities in Taiwan. The results of this study indicate that there is no increase in TOEIC scores between study programs, but there are significant differences in student scores from different study programs. Hospitality program students showed a significant increase in TOEIC scores, while tourism and catering students did not experience an increase.

Sheppard et al. (2018) researched the implementation of the method of working in groups for ESP courses for students of the Department of Science and Engineering at universities in Japan. Students are classified into two large groups. The first group consists of students whose English skills vary from the lowest to the highest, while the second group includes students whose English skills are relatively the same. The performance of students in these two groups can be seen from the increase in TOEIC scores. They concluded that the group work method was very beneficial for students with low English proficiency. On the other hand, this method is not beneficial for students who have high English proficiency.

In a study exploring the changing language and communication needs of three senior professional entrepreneurs in Hong Kong, Chan (2019) found that communication needs in business professionals can have a positive impact on ESP learning and ESP practice in higher education institutions. It is also stated in the article how these senior entrepreneurs use English and what difficulties they have encountered from the time they started their careers until now and how they have overcome these difficulties.

In the field of Science and Technology, Musikhin (2016) describes the development and updating of the syllabus, teaching materials, and teaching methods to improve the efficiency of ESP learning for students at universities in Siberia. This article emphasizes the importance of need analysis in the preparation of relevant and authentic teaching materials, appropriate learning methods, effective teaching approaches in improving the language skills needed by students.

## **2. Method**

### **Research Design**

This research includes Educational Research and Development where the targeted result is a textbook product of English for Specific Purposes (English II) in the field of Information Systems. QuotesGall et al. (2003,p.569):

Educational R & D is an industry-based development model in which the findings of the research are used to design new products and procedures, which then are systematically field-tested, evaluated, and refined until they meet specific criteria of effectiveness, quality, or similar standards.

With this approach, it is hoped that this research can improve the quality of learning and learning English II in the field of Information Systems.

### **Research procedure**

There are various Research and Development models but what we will use is the ADDIE model or Analyze, Design, Develop, Implement, and Evaluate. We consider this model the most suitable for use based on the objectives of textbook development. As the name implies, five procedures must be passed to produce a final product in the form of a textbook. The five procedures can be briefly described as follows:

1. **Analyze**, where at this stage the researcher identifies the things needed in developing an English for Computer Science textbook
2. **Design** is the stage where the researcher will arrange the expected achievements of each meeting and the appropriate form of learning evaluation.
3. **Develop**, is the longest stage in which researchers will produce a textbook product from the results of previous research procedures. In this process, researchers will be assisted by English education students, especially in collecting pre-defined teaching materials. After the teaching materials are collected, validation is carried out by expert validators and design validators to ensure the actuality of the textbook products.

4. **Implement**, where the textbook product was tested in the classroom to determine the level of readability and understanding of the material in the textbook. It's just that during this pandemic this section can be removed.
5. **Evaluate**, at this stage, the textbook product will be evaluated as a whole and then repairs will be made if necessary before being printed and published and used in teaching English for Information System students. This evaluation stage involves Information System students and lecturers.



*Figure 1. ADDIE Research Flow*

### 3. Discussion

The purpose of this research is to compile teaching materials in the form of sourcebooks for English for Specific Purposes (English II) courses for Information Systems Study Program students. The final output of this research is a textbook. In the process of preparing this textbook, the research team has carried out several activities, including:

#### Need analysis activities

This activity is the first step in designing an ESP. This analysis is carried out systematically about what is needed by students. This activity can be done by giving questionnaires to

stakeholders in collaboration with lecturers of the Information Systems Study Program. This questionnaire is comprehensive and includes relevant details about the targets to be achieved by students, as well as what students need and want and how they are realized. In addition, to enrich information, this activity was also carried out by involving 4th-semester Information System students who contracted the English Language Course II. This activity was held in May 2021. This activity produced sufficient data and information that could be used in the process of preparing textbooks.

### **Data collection and processing activities**

This activity is a continuation of the need analysis. The collected data is then processed as a basis for determining teaching materials. The things needed in the development of textbooks have been identified at this stage. Information Systems students need some skills that will be useful after they graduate. The skills that are emphasized are reading, listening, speaking, writing, and grammar. In addition to these skills, the research team added material about the TOEFL.

### **Activities for collecting textbook materials**

This activity takes quite a long time. Based on the results of the previous need analysis, the research team began to collect textbook materials obtained from published or unpublished literature, from students and triangulated sources. This activity took about 3 months.

### **Activities to design and develop textbook products**

This activity is a stage that is carried out after the teaching materials have been collected. The research team re-examined the material that had been collected. The material is evaluated, selected according to the learning objectives. Materials that are not suitable are set aside and replaced with new materials that are in accordance with the learning objectives. This activity is the activity with the longest duration of implementation. Currently, the research team has produced a draft textbook and is completing some parts of the material that are considered less relevant to be replaced with material that is in accordance with the learning objectives.

## **4. Conclusion**

Overall, research activities went smoothly but took longer than previously planned, especially at the stage of collecting teaching materials and the stage of designing and developing textbooks. This activity will be continued according to the plan that has been made previously.

This textbook product is targeted to be able to answer the English learning needs of Information Systems Study Program students in general because the information contained in



this book is up-to-date information and can provide direction for students in learning English independently. For this reason, it is recommended that lecturers who teach English II (English for Specific Purposes) courses can take advantage of this textbook. Because this textbook is designed in such a way as to meet the needs of students of the Information Systems Study Program, it is recommended and expected that this book can also be used by lecturers of other universities in Indonesia who teach English courses for Information Systems students.

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