



# Developing English for Specific Purposes (ESP) Book as Learning Material for Chemistry Students

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## Abstract

English for Specific Purposes means learning English based on students' needs. This research focuses on developmental research that aims to develop English for Specific Purposes book for Chemistry Education Department students of Musamus University and also to know the effectiveness of the book on the student's ability in English. The ADDIE Research and Development (R&D) model was used in this research. This ESP book was developed based on the problem and the need of the students in Chemistry Education at Musamus University. This developmental research consisted of five stages including analysis, design, development, implementation, and evaluation. The first was an analysis which means the researcher found out the need of the students before developing the book. The second was designed that prepared the content of the book. The third is a developmental stage that developed the content of the book which consisted of 12 chapters and doing the validation. The fourth is the implementation of the book in the teaching and learning process. The last was doing a trial of the book to know its effectiveness. The students of chemistry education were given the pre-test and post-test based on the content of the book. The pre-test was given before implementing the book while the post-test was given after implementing the book. The results of the ESP book that has been made indicate the following points: 1) the book based on the student's need, 2.) the content of the book was based on learning objectives and the experts gave good comments on the book content, 3.) The mean score for the pretest was 75.77, while the mean score for the post-test was 80.54. The result of this research can be concluded that English for Chemistry Students book was worthy and could improve the English ability of Chemistry Education Department students at Musamus University. Thus, this book can be a reference in the teaching and learning process.

**Keywords:** *Chemistry, textbook, ESP*

## **Introduction**

English for Specific Purposes (ESP) holds to complete English qualification stage that the material is made based on the learners' reason for learning. ESP helps the learners to master the language or to develop their competencies. In the context of teaching English in Indonesia, especially for non-English students, ESP was designed and applied to increase the ability of English for academic and professional purposes. Nowadays, in teaching English, one of the important components should be complete namely teaching material. Material is one of the important components in the teaching process, without teaching materials, teachers cannot teach optimally so learning objectives cannot be achieved properly. The development of teaching material is needed to compete with teachers' professionalism, leading to the aspect of content knowledge (Indriyani et al., 2023). Whereas, the development of teaching materials is an activity of creating, selecting, adapting, and arranging materials and activities that can help students achieve their learning goals (Hakim et al., 2021). In developing teaching material, someone should pay attention to some criteria for creating good and interesting material. Good teaching materials should provide a stimulus to the learner, interesting text, and fun activities that can involve the learner's thinking process, and should provide a model of using language that is correct and relevant to the learning context.

In this research, the researchers try to develop learning material based on students' needs. According to (Indriyani & Uspayanti, 2023), the demand in developing learning material for ESP is discovering the students' needs and selecting the appropriate material. Meanwhile, materials itself have a very important meaning in maintaining and enriching learning resources and increasing learning activities and creativity. Some terms are included in it such as book, module, diktat, etc. The researchers more focus on the development of a textbook that was designed based on students' needs. Textbooks are material presented in writing presenting knowledge that is arranged systematically. According to (Millah et al., 2012), in their journal said that textbooks are subject material arranged systematically consisting of competencies that will be mastered by students. Textbooks are tools that make it easier for students to improve their knowledge and skills which are used as a basis for achieving learning objectives.

Based on pre-observation, the researchers found some problems that occur for the students from other majors in studying English that they did not use appropriate textbooks where they only study English in general without studying English specifically. The textbooks presented are in the form of books that are not related to specific English vocabulary. Thus, books and materials available in the market generally cannot accommodate the needs of ESP learners. In this development research, the researchers designed textbook related to the students'

chemistry education need that start with chemistry vocabulary, the periodic table, laboratory tools, and chemical experiments.

Nowadays, students' need in learning English is not always focused on general English, but the learners also need to understand the English language which is relevant to their major study especially when it comes to the university level. The implementation of ESP makes the learners realize that there is a significance between learning English for Specific Purposes and learning general English but the main term is the process of learning ESP means combining specific language and general language with the purposes is intended to fulfill what learners focus because ESP refers to learning English that is oriented to the special needs. ESP is standing as an approach than as a product of the teaching and learning process (Bhatia & Bremner, 2014). According to (Burhanuddin & Sulaiman, 2020), ESP refers to learning English oriented on the specific needs of learners based on their focus and jobs. ESP has a different approach and content from General English (GE). The purpose of ESP is for students in order they can know more English in the field they are studying. For example, the students in the chemistry education department should be given English material that is related to chemistry vocabulary such as vocabulary about the periodic table, laboratory tools, chemistry experiments, etc. If the teacher teaches engineering students, the teacher must give the material related to engineering. The development of ESP materials is based on needs analysis. Needs analysis is the identification of the language and skills used to decide and choose materials in ESP. This analysis assess learners and the learning process at the end of the learning period (Basturkmen, 2010). Moreover, ESP arranges the language features of the learners to improve language skills for occupation and discipline.

Some researchers have tried to develop English textbooks as learning tools for students specially designed English for Specific Purposes (ESP) textbooks. (Syakur et al., 2020) focused on the development ESP textbook for pharmacy students using online learning, the result showed that the book is eligible and making students practice and improve their English independently. While other researchers develop textbooks to make the learners easy in learning and understanding the material. While (Nahak & Bulu, 2020) stated that Textbooks are one of the important learning resources in classroom learning. The usefulness of textbooks in learning mathematics in the classroom can improve math problem-solving skills. This research is also developmental research that develops ESP learning textbooks for Chemistry Education Department students at Musamus University. This book is designed to fulfill the students' needs including vocabulary related to chemistry and other material focusing on chemistry. After developing English for a chemistry book, the researcher found out the effectiveness of the ESP book on students' ability in English. Thus, having a deep understanding of ESP could help students to improve the quality of pursuing their targeted careers.

## **Method**

This research focused on developmental research namely R&D research and development. According to (Sugiyono, 2011), R&D model refers to the research method that produces a certain product and tries to test its effectiveness of the product. This research focused on producing English language learning products namely ESP book for Chemistry Education Department students. The model used is the ADDIE model which consisted of five stages including analysis, design, development, implementation, and evaluation. These steps were developed by Dick and Carry (Mayfield, 2011).

In collecting the data, the researchers used some stages, the first step is analysis. The researchers analyzed the students' needs in Chemistry Education Department of Musamus University. Second, the researchers prepared the concept and material related to chemistry. Third, the researchers developed the book draft and the book draft was validated by the experts. The next step was the implementation step, In this section, the researchers gave this textbook to the learners as the tools in the learning process. Finally, an evaluation was carried out to measure the success of using English for chemistry students by using the test. The test given included pre-test and post-test. Those tests were given to see the effectiveness of English d for chemistry book.

## **Results**

### **A. The Description of Product Result Developmental**

Based on the developmental research that the book made consisted of four parts. The first part was pra-introduction which consisted of a cover, preface, and table of content. The second part was an introduction that consisted of background, the description of the book, learning objectives, and an outline of the material. The third part was the content of the book which consisted of 12 chapters, a chapter for the introduction, and 10 chapters for the main content of the book. This book included introducing self and others, parts of speech, chemistry vocabulary, chemistry in our life, laboratory tools, describing things, the periodic table, sentences and cause. Thus, for the last chapter namely chapter 12 related to additional important ESP vocabulary. Every chapter of the book included success indicators and exercises. The last part of this book namely completing part consisted of closing and references to the book.

### **B. The Result of Validation from Experts**

After the book was complete, the researchers asked some experts to validate the book. The validation has been done by 3 experts, two English lecturers, and one chemistry education lecturer. The researchers gave the book draft and sheet for reviewers to comment on the content of the book draft. Based on the result of reviewers that the first reviewer commented that the content of the book draft has been based on students' level. The researchers needed to add some exercises and

references from the book. Thus, the researchers needed to add some examples from explanation material in some chapters of that book. For the comments of the second reviewer, the researchers needed to verify the material for part of speech and gave more examples, added the evaluation for local wisdom. While for the third reviewer that the book draft has been based on the criteria and learning objectives. After getting the review result, the researchers completed and added some terms that has been asked by the reviewers.

C. The Result of Test Related to the Effectiveness of Textbook

To obtain this data, the researchers gave pre-test and post-test to students in the Department of Chemistry Education to see the effectiveness of the textbooks in improving student learning outcomes. In this research, the researchers gave the test to 13 students. The test was designed based on the content of the book that has been developed.

Table 1. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE-TEST	75.77	13	5.703	1.582
	POST-TEST	80.54	13	6.960	1.930

The researchers found out the mean score of the test using SPSS version 21 in order the results displayed were more valid and avoided miscalculations in seeing the increase in student learning outcomes. Based on table 1, there is an improvement in students' test results after being given the book in the learning process. The mean score for the pretest is 75.77, while the mean score for the post-test is 80.54.

Table 2. Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 PRE-TEST - POST-TEST	-4.769	3.745	1.039	-7.032	-2.506	-4.592	12	.001

The value of Sig.(2-tailed) is  $0.001 < 0.05$ , it can be concluded that there is a difference between the students' pre-test and post-test results before and after the implementation or treatment given. Based on table 2, there is a difference of learning results for the pre-test and post-test after students used the book in learning.

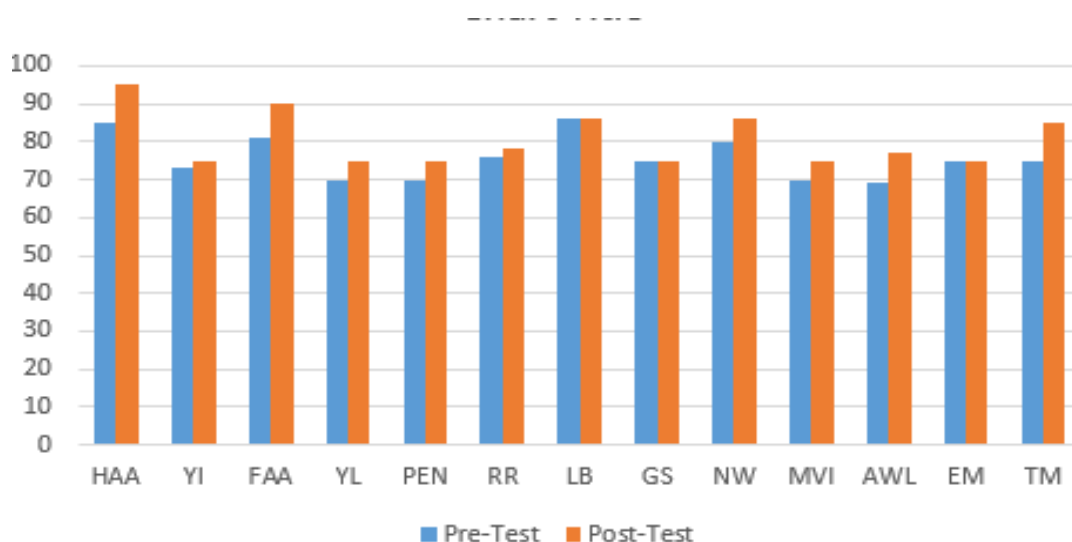


Figure 1. The Result of Pre-test and Post-test

Based on figure 1, it can be seen that there was an improvement result test of students in Chemistry Education Department of Musamus University after using “English for Chemistry Students” book.

## Discussion

The need for the development of teaching materials is motivated by several things. First, the materials used are more about providing English material in general, not English material that leads to English for Specific Purposes or English that leads to chemical vocabulary and texts related to Chemistry. In addition, the materials used previously were not equipped with a collection of exercises related to Chemistry. Furthermore, the English language skills of chemistry students are still relatively low and there is no manual material in the learning process.

The first step was done by the researchers for developmental research that analyzed the students' need for Chemistry Education Department of Musamus University. Second, the researchers prepared the concept and material related to chemistry to develop this ESP for Chemistry students. The ESP book consisted of 12 chapters that were completed by exercises. The ESP book was completed with the material related to chemistry starting with chemistry vocabulary, chemistry text, experiment ways, the periodic table, laboratory tools, etc. The book made consisted of four parts namely pra-introduction consisted of cover, preface, and

table of content. The second part was introduction consisted of the background, the description of the book, learning objectives, and an outline of the material. The third part is the content of the book related to chemistry. The last part of this book namely completing part consisted of closing and references to the book. This ESP book should be developed early to save the need of students. According to (Agustina, 2014), ESP generally means an English learning approach based on the needs of the learners. Thus, teaching English by using ESP is one of the efforts to equip students with English language skills based on their field of expertise and will be very useful for them in carrying out their profession in the future (Hamidah & Yanuarmawan, 2019).

Textbook is very important to be developed because it can be used as a tool, reference, and evaluation material. In addition, teaching materials help students to achieve meaningful learning and learning objectives. (Dick et al., 2009) stated that teaching materials contain content that students need to learn which is facilitated by educators to achieve certain goals. After the researchers developed the book, the next step was doing the validation. The validation was done by three reviewers from 2 lectures of English Education and 1 lecturer of Chemistry education. Based on the result of reviewers that the researchers needed to add some exercises and references from the book, added some examples from explanation material in some chapters of that book, verified the material for part of speech, gave more examples, added the evaluation for local wisdom, and the book draft has been based on the criteria and learning objectives. After getting the review result, the researchers completed and added some terms that has been asked by the reviewers.

For the last step of developmental research, the researchers did the trial of the book by giving the test to know the effectiveness of "English for Chemistry Students book". The test was given including pre-test and post-test. Based on the result of the test, it can be seen that there is an improvement in students' test results in class after being given the book in learning process. The mean score for the pretest was 75.77, while the mean score for the post-test was 80.54.

Developmental research has been done by some researchers. (Burhan, 2019) has developed Science textbook based on mind mapping to improve students' ability in Science (IPA), the result of the study showed that the textbook was worthy and effective to improve the ability in Science of students in Elementary School Pudukpayung 02. Thus, (Syakur et al., 2020) have developed ESP learning textbooks for students D3 Pharmacy at the Surabaya Pharmacy Academy to know the effectiveness and to know students' responses to ESP textbooks. This research also used the ADDIE Research and Development (R&D) model and the result showed ESP textbook was eligible and can be used as an online learning medium for teaching English. This research also focused on the developmental research using ADDIE Research and Development (R&D) model. The result of this research can be concluded that English for Chemistry Students book can improve the English ability of Chemistry Education Department students at Musamus University.

## Conclusion

Based on the developmental research result, it can be concluded that the book has fulfilled all the criteria needed in developmental research. It focuses on the use ADDIE Research and Development (R&D) model that consisted of five stages including analysis, design, development, implementation, and evaluation. The English for Chemistry Students book can be stated as worthy to be used because it has been checked by some experts. This book also has been tested on chemistry students. Based on the result of the test, there was an improvement in students' test results after being given the book in learning process. The mean score for the pretest was 75.77, while the mean score for the post-test was 80.54. The result of this research can be concluded that English for Chemistry Students book was worthy and can improve the English ability of Chemistry Education Department students at Musamus University.

The developmental book can be a learning source for students and English teachers and lecturers, especially for chemistry students. This book not only was designed with the material but also the evaluation related chemistry. Thus, this research also can be the lead for the next researchers who want to do the same research, especially the developmental ESP book.

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