

Developing a Handbook of Peatlands and the Smog Disaster: An English for Specific Purpose (ESP)

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ABSTRACT

In 1998, 2002, and 2015, Indonesia experienced the worst smog disaster. Not only caused disruption in Indonesia, but the smog also caused problems in neighbouring countries. Most people think that this is the result of forest fires, but in fact the smog is caused by something else related to peatlands. This must be introduced to the people of Indonesia and the world so that there is no ongoing misunderstanding. Therefore, the authors developed an English for Specific Purpose (ESP) textbook related to peatlands and smog. This research is intended to develop a textbook on the relationship between peatlands and smog disasters which will be used for the educational process related to this matter which will be distributed in the form of textbooks. The methodology used in this research is Research and Development, where researchers will conduct data and information collection qualitatively. Furthermore, the findings will be the basis for the development of textbooks containing material about peatlands and smog. The results showed that the smog that occurred, especially in the Kalimantan area, was not pure due to the burning of forests for plantation land only. The smog turned out to be caused by burning peatlands where the fire was below the surface of the ground, making it difficult to extinguish and cause smoke to continue to spread for a long time. Root structure and content in peatlands is the main source of smog problems. This was then used as material for the preparation of English for Specific Purposes textbooks: Peatlands and the Smog Disaster. This research is limited only to peatlands in Kalimantan, smog, and developing textbooks as an educational tool. Since the focus of this study is only on the peatlands and the smog disaster developed for textbooks as educational reference material, the results of this study can be said to be classified as new research and have a high urgency to be carried out.

Keywords : *peatlands, smog, ESP textbook*

INTRODUCTION

In 1998, 2002, and 2015, Indonesia experienced the worst smog Catastrophe. Not only precipitated disruption in Indonesia, but the smog also brought on problems in neighbouring countries. Most people feel that this is the result of forest fires, but in fact the smog is led to by anything else linked to peatlands. This afford be delivered to the people of Indonesia and the world so that there is no ongoing misunderstanding. Thus, the authors built an English for Specific Purpose (ESP) textbook connected to peatlands and smog.

A. Peatlands

Peatlands are landscapes composed of imperfect decomposition of vegetation from waterlogged trees

so that the conditions are anaerobic. The organic material continues to accumulate for a long time so that it forms layers with a thickness of more than 50 cm. Soil types are often found in areas saturated with water such as swamps, basins, or coastal areas (Paavilainen & Päivänen, 1995).

Most of the peatlands are still forests which are the habitat of rare plants and animals. Peat forests have the ability to store large amounts of carbon. Carbon is stored from the surface to the soil, considering that its depth can reach more than 10 meters. Peat soils have the ability to store water up to 13 times its weight. Therefore, its role is very important in hydrology, such as controlling floods during the rainy season and removing water reserves during long

droughts. Damage to peatlands can cause disasters for the surrounding area (Paavilainen & Päivänen, 1995).

Peatland consists of the remnants of trees, grasses, mosses and dead animals, whether or not decomposed. Peat soils usually form in wet environments. The decomposition process in peat soils is hampered due to anaerobic conditions which cause the least number of decomposing organisms. Peat soils form over a long period of time, around 10,000-5,000 years ago. Peat forests in Indonesia are thought to have been formed for 6,800-4,200 years. The deeper the peat soil gets older. The rate of peat soil formation ranges from 0-3 mm per year (Fahmuddin & Subiksa, 2008).

The process of peat formation starts from shallow lakes which are overgrown with water plants and other wetland vegetation. Dead water plants then decay and form an organic layer at the bottom of the lake. Layer after layer forms on the mineral soil at the bottom of the lake, over time the lake becomes full and peat layers form. The layer of peat that fills the lake is called topogenous peat. Plants can still thrive on topogenous peat soils. The weathering results of the plant will form a new layer that is higher than the surface of the original lake water. Form a layer of peat that is convex like a dome. Peat soil that grows on topogenic peat is orogenic peat. This type of peat is less fertile than peat topogen. Its formation is more determined by rainwater which has a washing effect (bleaching) so that it is poor in minerals.

According to their conditions and characteristics, peat can be distinguished from topogenic peat and orogenic peat (Anwar, Damanik, & A.J.Whitten, 1984). Topogenous peat is a layer of peat soil formed by standing water that is blocked by drainage in sunken lands behind the coast, inland or in the mountains. This type of peat is generally not so deep, up to about 4 m only, not so acidic and relatively fertile water; with nutrients derived from mineral soil layers at the bottom of the basin, river water, plant debris, and rainwater. Topogenic peat is relatively uncommon. Erogenous peat is more often found, although all orogenic peat starts as a topogenous peat. Erogenous peat is older in age, generally the peat layer is thicker, to a depth of 20 m, and the surface of the peat is higher than the surface of the nearby river. The soil nutrient content is very limited, only sourced from peat layers and from rain water, so it is not fertile. Rivers or drainage

coming out of the orogenic peat area drain water with high acidity (pH 3.0–4.5), contain a lot of humid acid and have a blackish brown colour like the colour of concentrated tea water. That is why such rivers are also called black water rivers (Anwar, Damanik, & A.J.Whitten, 1984).

Most of the orogenic peat forms not far from the coast. This peat soil is likely to start from mangrove sediment soils which then dry up; the high salt and sulphide content in the soil results in only a few inhabitants being decomposed microorganisms. Thus, a layer of peat begins to form above it. Research in Sarawak shows that peat began to form on mangrove mud some 4,500 years ago; initially with a hoarding rate of about 0.475 m / 100 years (at peat depths of 10-12 m), but then shrinking to around 0.223 m / 100 years at depths of 0–5 m Presumably the older the forest on this peat soil grows the slower due to the reduced availability of nutrients (Anderson, 1964).

B. Needs Analysis of ESP

The consequences of the display analysis aid us as teachers to determine the researcher prospective professional Display, the researcher exhibit in terms of language skills and the researcher deficiencies in the environment of language skills. Only after analysing the researcher display and grow to be the targets of the language course, we can select a material that meets the demands of the researcher. Thus, display analysis is the basis on which we can develop curriculum content, teaching materials and methods that can lead to rising the inexperienced persons' motivation and success.

In this research, the material development was conducted based on the Need Analysis including five broad areas of the need analysis (Duddley-Evans & John, 2009):

- a) target situation analysis and objective needs analysis (e.g. tasks and activities learners will use English for);
- b) linguistic analysis, discourse analysis, genre analysis, i.e. knowledge of how language and skills are used in the target situations;
- c) subjective needs analysis, i.e. learners 'wants, means, subjective needs-factors that affect the way they learn (e.g. previous learning experiences, reasons for attending the course, expectations)
- d) present situation analysis for the purpose of identifying learners' current skills and

language use; means analysis, i.e. information about the environment where the course will run.

METHOD

The methodology used in this research is Research and Development, where the researcher conducted data and information collection qualitatively. Furthermore, the findings will be the basis for the development of textbooks containing material about peatlands and smog. Simply, the process of the research can be described as follows:

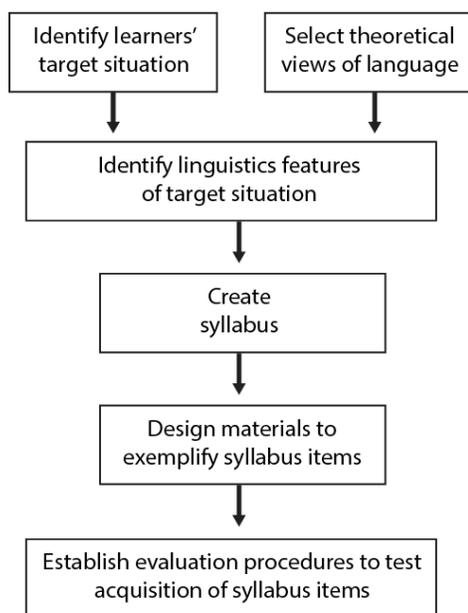


Figure 1 Process of Research

FINDINGS AND DISCUSSIONS

A. Peatlands Burning

Damage to peatlands often occurs due to human activities, such as the conversion of peat forests into agriculture, plantations and forestry. Peatlands in Southeast Asia, including Indonesia, experience the highest rate of damage. The greatest damage was caused by land conversion for oil palm and pulp plantations. Damage to peatlands begins with the process of forest clearing (land clearing). The next process is the drying of land which aims to remove the water contained in peat soils. You do this by making a ditch or drainage channel so that water flows out. This drying process causes the peat surface to fall. So that the trees found on the surface of the ground cannot stand strong because the roots are protruding. Many trees have fallen on unhealthy

peat. Draining on peatlands has irreversible characteristics. Once water is removed, peat will lose some of its ability to store water. In the dry season it will be prone to fire. The process of peat forest fires is the release of large amounts of carbon into the atmosphere and destroying forest biodiversity. Conversely, in the rainy season the forest cannot absorb water properly which causes floods.

Peatlands store 550 G tons of carbon, this amount is equivalent to 75% of carbon in the atmosphere, twice the amount of carbon contained in all non-peat forests and equal to the amount of carbon from all biomass on earth. The danger of peat damage is not only felt locally and regionally, but rather contributed to the global disaster of climate change. Carbon emissions can be released during peat conversion, from clearing of vegetation, forest fires, to the process of peat decomposition due to agricultural activities (Fahmuddin & Subiksa, 2008).

Fires that occur in peatlands also exacerbate the situation. In Sumatra and Kalimantan, peatland fires reached an average of 32.1% and 25.1% in this decade. In natural conditions, peatlands are not flammable because of their sponge-like nature, which absorbs and retains water maximally so that in the rainy and dry seasons there is no difference in extreme conditions. However, if the condition of the peatland has begun to be disrupted due to land conversion or canal making, then the ecological balance will be disrupted. In the dry season, peatlands will be very dry to a certain depth and flammable. Peat contains fuel (plant residues) below the surface, so that fire in peatlands spreads below the soil surface slowly and is difficult to detect, and causes thick smoke. Fire on peatlands is difficult to extinguish so that it can last for months (months). And, can only be totally dead after intensive rain (Tentang Kami: WWF Indonesia, 2019).

B. ESP Textbook: Peatlands and the Smog Disaster Based on that fact, there were three main parts that should be included in the ESP books. They are Reading Topics, Grammar Focus, and Thinking and Writing. Each chapter contains all of the three parts with different sub-parts.

1) Reading Topic

a) Chapter I The History of Peatlands Burning

- This chapter focuses on the peatlands burning occurred in the previous years, especially the one in Kalimantan island.
- b) Chapter II Why the Peatlands are Burning?
This chapter focuses on the elaboration of why the peatlands are burning every year and causes a great disaster in form of smog.
- c) Chapter III The Latest Condition and Action
This chapter focuses on the description of the current condition of the disaster that causes many people suffer from it.
- d) Chapter IV What have We Done?
This chapter focuses on what have been done by the government and the people in order to overcome the smog disaster.
- e) Chapter V What Will We Do in the Future?
This chapter focuses on the plan created by people and government to avoid the peatlands burning in the future; therefore, the smog can be anticipated before it causes more casualties.
- 2) Grammar Focus
- a) Chapter I Simple Past Tense
This part is related to the reading section. Since the reading texts are exposing the news about the smog in the past, this tense will be the main focus.
- b) Chapter II Simple Present Tense
This part is related to the reading texts in Chapter II. Since the reading texts are about the fact of peatlands burning and smog, the tense focus is about the Simple Present Tense.
- c) Chapter III Present Continuous Tense
Like the parts I and II, this is directly related to Chapter II discussing about what is happening. That is why, the Present Continuous Tense becomes the grammar focus.
- d) Chapter IV Present Perfect Tense
According to the reading section of Chapter IV, this part focuses on the Present Perfect Tense where the students learn to tell what have happened and have been done by the government and the people to overcome the problem.
- e) Chapter IV Simple Future Tense
In this part, the students learn to express their ideas about what they want to do in the future to overcome and anticipate the smog.
- 3) Thinking and Writing
- a) Chapter I Narrative Paragraph
In this part, the students will learn how to write a paragraph talking about their own experience facing the smog and telling how they felt at that time.
- b) Chapter II Expository Paragraph
In this part, the students will learn how to write a paragraph talking about the smog disaster that happens around them every year.
- c) Chapter III Descriptive Paragraph
In this part, the students will learn how to write a paragraph discussing about the latest condition of the smog victims inside and outside of Kalimantan island.
- d) Chapter IV Persuasive Paragraph
In this part, the students will learn how to write a paragraph to persuade people to keep moving and trying to solve the present problems by elaborating what have been done by the government and the people to overcome the disaster.
- e) Chapter IV Argumentative Essay
In this part, the students will learn how to write an essay, not a paragraph anymore, since they will have to sum up what they have learned before and express their opinions about what will happen in the future regarding the smog and how to anticipate it.

CONCLUSION

Having done conducting the research, it can be concluded that there are five essential facts which can be the main focus of the ESP Textbook such as the past incident regarding the peatlands burning, the facts of the smog, the recent situation, the actions taken by the government and the people to overcome the smog, and the plan to anticipate it in the future. Based on those facts, the ESP Textbook are written in five chapters with reading section, grammar focus, and thinking and writing section. All of chapters are continuous and systematic, therefore it can help the students to understand the book easily. Besides receiving information, through the book, the students are also required to think and express their ideas regarding the information they get from the reading section of each chapter. It is expected that this book can be useful since it brings the latest issue in Kalimantan. It is also expected that this book will also be reference for the next researcher who intends to conduct the same field of

study. However, it is suggested to the other researcher to conduct research and elaborate the fact from the other point of views in order to deepen and enlarge the scope of this research.

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