

**The Teaching of Natural Sciences in English at SMPN 1
Rambatan, Tanah Datar**

THESIS



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ABSTRAK

Eky Erlanda Edel. 2011. The Teaching of Natural Science in English at SMPN 1 Rambatan, Tanah Datar

Penelitian ini bertujuan untuk menemukan cara guru mengajarkan mata pelajaran IPA (biology dan fisika) dengan menggunakan bahasa Inggris dalam proses mengajar belajar di kelas bilingual RSBI di SMPN 1 Rambatan. Aspek yang diteliti meliputi cara guru dalam: menyediakan dan menyampaikan materi, meningkatkan kosakata siswa bahasa Inggris IPA siswa, memvariasikan kegiatan pembelajaran IPA dan menilai kemampuan belajar siswa di kelas bilingual SMPN 1 Rambatan.

Populasi dari penelitian ini adalah seluruh guru IPA di SMPN 1 Rambatan, Tanah Datar. Sampel dari penelitian ini adalah guru IPA yang mengajar dikelas 2 bilingual. Pengumpulan data yang bersifat kualitatif dilakukan dalam beberapa tahap; data rekapitulasi nilai ujian IPA dalam bahasa Inggris semester pertama tahun ajaran 2010/ 2011, observasi dan wawancara. Peneliti mengambil data observasi dari 4 kali pertemuan yang efektif dan di akhir pertemuan peneliti mewawancarai guru guna melengkapi data yang tidak terjawab selama observasi.

Dari hasil penelitian ditemukan bahwa guru mengetahui bahwa penggunaan bahasa Inggris dalam proses belajar di kelas bilingual sangat penting namun guru mengalami masalah dalam menemukan strategi yang tepat untuk memperkenalkan bahasa Inggris pada siswa dengan kemampuan bahasa Inggris mereka yang terbatas. Berdasarkan data yang diperoleh, dapat disimpulkan bahwa guru memiliki media dan bahan ajar dalam bahasa Inggris namun guru masih kurang mampu mengembangkan dan mengintegrasikannya dalam proses belajar siswa. Guru juga mengalami masalah dalam meningkatkan kosakata bahasa Inggris IPA dan menyituskasikan siswa dalam berbagai test dalam bahasa Inggris. Oleh sebab itu, wajar jika data rekapitulasi sekolah menunjukkan siswa bermasalah dalam ujian IPA berbahasa Inggris.

ABSTRACT

Eky Erlanda Edel. 2012. The Teaching of Natural Science in English at SMPN 1 Rambatan, Tanah Datar

The aim of the research was finding the ways of teachers in teaching Natural Science (Biology and Physic) in English at bilingual class of RSBI, Rambatan, Tanah Datar. There were some aspects observed in the research; providing and presenting the materials, improving the students' vocabulary mastery, varying the Science teaching activities and assessing the students' progress at bilingual class of RSBI.

The informant of the research were the science teachers of SMPN 1 Rambatan, Tanah Datar for grade 8th at bilingual class. Data collection was in qualitative that were collected in some steps: the recapitulation of Science scores of evaluation in English year 2010/ 2011, observation and interview. The data of observation were collected in four meetings and at the end of observation the teachers were interviewed by the researcher to complete the data.

It was known from the result of observation that the teachers knew the important of English at bilingual class of RSBI; however they got some problems in introducing and integrating the language to the students because of their limited skills in English. Based on the data collection, it can be concluded that teachers had the media and teaching materials for bilingual students but they face some problems in integrating them into teaching learning processes. Teachers also got problems in encouraging the students' vocabulary mastery and situating the students into Science English testing. Hence, it was normal if the school recapitulation of natural science evaluation had some problems.

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CHAPTER 1

INTRODUCTION

A. Background of the Problem

Nowadays, the use of English as the medium of instruction in teaching learning processes of natural sciences is applied in Indonesia through the implementation of SBI (Sekolah Berstandar Internasional) and RSBI (Rintisan Sekolah Berstandar Internasional). The Implementation of this program is aimed to improve the quality of education in Indonesia, especially in preparing the students to be able to acquire the content of science materials and to communicate in English. Then, this program also conducts the students to follow some international competitions such as Olympiads so that the teaching learning processes in RSBI/ SBI focuses on the students' mastery in English, math, natural sciences and ICT (Information Communication Technology).

According to the guide book of RSBI implementation (2010), the Indonesian government policy, number 20 year 2003 section 50 articles 3 about the national educational system (UU Sisdiknas No. 20 tahun 2003 pasal 50 ayat 3), this policy states that government and the regional government provide at least one educational institution in every level of education to be developed with the international level. Moreover, in improving their program, the government conducts some schools to be RSBI as the preparation of SBI based on Permen No 73 year 2009 section 25 that states government provide some educational institutions to be prepared as the International Standardized School during four

years. Up to now, several schools in the level of elementary, secondary, general and vocational high schools have been chosen as the piloting school of SBI.

In west Sumatra, the implementation of SBI/ RSBI has been done for more than four years. However, there is misunderstanding in adaptation and adopting the international curriculum in order to fulfill some characteristics of SNP that is applied by the implementers such as government, curriculum makers and educators. They believed that in improving the Indonesian quality of education, the educational systems of a country of OECD (Organization for Economic Co-operation and Development) such as UK and US should be totally adopted. In fact, there are some problems that faced by the government, curriculum makers and educators in adopting the educational systems of OECD in SBI/ RSBI.

Based on the researcher' preliminary research, SMPN 1 Rambatan has one bilingual class in every level of class where the teachers of sciences and mathematics have to use English and Indonesian as the medium of instruction in teaching learning processes. One of the efforts done by the natural sciences and mathematic teachers in SMPN 1 Rambatan was by following the training for natural sciences and mathematics teachers in creating lesson plan, teaching materials and media with facilitators from some universities in Padang such as UNP and UNAND for eight times in a semester. The teachers confirmed that the training did not focus on teaching Science in English but on the teaching component of science in English such as lesson plan or syllabus. It can be concluded that the Science teachers have prepared the syllabus and lesson plan properly that have been guided by the facilitators from UNP and UNAND.

However, based on the preliminary research, the researcher also found some problems related to the teaching of natural Science in English at SMPN 1 Rambatan, Tanah Datar. The first problem is the difficulties in preparing the lesson plan in English of teaching learning processes. In bilingual class, the lesson plan should be in English so that it can be implemented in teaching learning processes. Although the teachers have been guided by the facilitators in preparing the lesson plan, it was still found that the teachers prepared the lesson plan of bilingual class in Indonesian. They confessed that the lesson plan in English is only as the requirement of RSBI to be submitted to the school. In addition, they said that it was difficult to make the lesson plan in English, particularly in linguistic area of English.

The second problem found was about the teachers' difficulties in teaching in English. Astika (2008) states that teachers in SBI/ RSBI need to encourage their English by following some courses which will be influenced by their attitude, motivation, aptitude, ages, etc. Mostly, the teachers in the school have problems with their ages; more than 40 years old that would be a factor of memory problems, their willing to learn more new information about the new materials and media, and especially to learn English. According to Agus (2011), memory will be decreased as the ages that make an old man become slower than children in learning new things. In addition, based on the interview with the headmaster of the school, it was known that the facilitators of RSBI from some universities were invited for eight times in a semester in helping the teachers in teaching in English. In fact, based on some language research, it was known that language mastery can

be achieved properly since the childhood. Hence, it would be difficult for the teachers to mastery English in eight times courses and without any supported courses beyond the school.

Furthermore, the third problem was about the government, especially in Kabupaten Tanah Datar who developed this program in SMPN 1 Rambatan indicated the passiveness in handling the problems in RSBI. Based on the preliminary research, the researcher found that the government had no idea about mutation of well prepared teachers of RSBI to SMPN 1 Rambatan. It means that the school has to improve their quality as a pioneer of International school with their unprepared teachers. In addition, the teachers have never been supported by financial support in improving their competencies in teaching the bilingual class. And the last, the government treat this school as the regular school where all students from Kabupaten Tanah Datar can enter this school without special characteristics of selection.

As the result, based on the preliminary research, the researcher found in the data of the school grade recapitulation for the first semester year 2010/ 2011 that there were some differences between the students' grade in English and in Indonesian of natural sciences evaluation. Based on the data, the students' grades of natural sciences in Indonesian were higher than their grades of the same materials in English. In detail, 19 from 24 students in the first grade of SMPN 1 Rambatan of bilingual class obtained the Minimal Grade of Completeness Criteria (MGCC) or known as Kriteria Ketuntasan Minimal (KKM) for natural science; 70 for the evaluation in Indonesian. On the other hand, none of them passed the

KKM for the evaluation in English. Moreover, 17 from 24 students in the second grade of SMPN 1 Rambatan of bilingual class obtained the KKM for natural science; 72 for the evaluation in Indonesian and none of them could pass the KKM for the evaluation in English. Then, it can be concluded that the students faced some problems in evaluation processes of natural sciences in English.

As stated in the guide book of RSBI Implementation (2010), it is known that the students of bilingual class are selected through some conditions. Their academic reports, especially in English will be considered as the factor of the selection. Based on the preliminary research, most of the students of bilingual class were good in English. They were so enthusiastic in communicating in English. However, from a brief interview with the students, they confessed that they found some difficulties in examination in which the test items were written in English. They said that English of science was more difficult than general English beside that their teachers were not really capable in teaching natural science in English. They also confessed that although they used bilingual books of Sciences and the teachers used the media in English but they were rarely integrated to the language.

Furthermore, on the teachers' side, they said that mathematics and sciences were the most difficult subjects for the students. It was difficult to make the students understand even in Indonesian language as the medium of instruction. In addition, they confessed that the most difficult problem for them in teaching natural sciences in bilingual class was the language problem. Most of the teachers told that they were not only have to prepare the materials of natural sciences but

also have to prepare themselves to use scientific English that is considerable more complicated than General English.

It can be concluded that applying the international curriculum by using English in RSBI should consider the factors of the students and the teachers' background knowledge in English and the implementation of the curriculum that will be related to the qualities of the output of the school. Briefly, good teaching learning processes will give a good impact on the evaluation processes. Then, the difference grades of the students in evaluation of natural sciences in Indonesian and English are considered as the evidence that the students and the teachers have some problems in using English as the medium of instruction while teaching learning processes of natural sciences.

From the description above, the researcher was interested in observing the the teaching of Natural Science in English at bilingual class of RSBI in SMPN 1 Rambatan, Tanah Datar.

B. Identification of the Problem

According to Astika (2008), the teachers of bilingual have some roles in teaching: a) as implementer, who design and manage the teaching learning processes, explain about some terms in English, and encourage the students' vocabulary in English, b) as material designer, who plan the teaching learning processes, match the suitable materials to the syllabus and the students' background knowledge, and c) as evaluator, who evaluate the effectiveness of teaching materials by doing some evaluation processes to the students. It can be said that to be a teacher of bilingual class the teacher need sufficient preparation, readiness and requires qualified people at school. It is not only about the use of English in teaching learning processes but also how to integrate the language and the materials to the students.

In SMPN 1 Rambatan is one of the RSBI in Tanah Datar that should prepare itself in many aspects. The program of RSBI is influenced by many factors that should be fulfilled such as the curriculum's goal, teaching learning processes, evaluation, facilities, finance and human resources including the school administrators, the teachers and the students who are involved in the implementation of this program. However, the teachers found some difficulties in teaching learning processes that cause some effects in evaluation processes. The main problem of the teaching learning processes of natural sciences in Bilingual class is the language. The use of English in teaching learning processes become a problem when the teachers have limited preparation, times and finance in learning English for specific purposes.

Then, based on the preliminary research done by the researcher, the students' achievement for the same materials of natural sciences in the first semester year 2010/2011 in Indonesian was higher than the evaluation of Science in English. It can be proved that the teachers and students face some problems of language in teaching learning processes that cause some effects in the evaluation of natural sciences in English.

From the identification of the problems above, the researcher is interested in conducting a research on the ways of the Science teachers teaching natural sciences in English as the medium of instruction at the bilingual class of RSBI in SMPN 1 Rambatan, Tanah Datar.

C. Limitation of the Problem

Actually, there are many problems that can be observed in the research due to the implementation of RSBI in SMPN 1 Rambatan, Tanah Datar. However, the description of the teaching of Natural Science teachers in English at the bilingual class of RSBI in SMPN 1 Rambatan, Tanah Datar was decided by the researcher as the limitation of the problem in the research.

D. Formulation of the Problem

Based on the limitation of the problems above, the problem was formulated as follows: How do the Science teachers teach the Natural Science in English at the bilingual class of RSBI in SMPN 1 Rambatan, Tanah Datar?

E. Research Questions

In order to make the formulation of the problem more specific, the question above was developed into the following questions:

1. How do the Science teachers provide and present the materials in English at the bilingual class of RSBI in SMPN 1 Rambatan?
2. How do the Science teachers improve students' science vocabularies mastery in English at the bilingual class of RSBI in SMPN 1 Rambatan?
3. How do the Science teachers vary the teaching activities in English at the bilingual class of RSBI in SMPN 1 Rambatan?
4. How do the Science teachers assess students' progress in English at the bilingual class of RSBI in SMPN 1 Rambatan?

F. The Purposes of the Research

This study is aimed at describing how the Science teachers prepare and conduct the teaching learning processes by using English at bilingual class at SMPN 1 Rambatan, including:

1. finding out the Science teachers' ways in providing and presenting the teaching materials in English at the bilingual class of RSBI in SMPN 1 Rambatan.

2. finding out the Science teachers' ways in improving students' Science vocabularies mastery in English at the bilingual class of RSBI in SMPN 1 Rambatan.
3. finding out the Science teachers' ways in varying the teaching activities in English at the bilingual class of RSBI in SMPN 1 Rambatan.
4. finding out the Science teachers' ways in assessing the students' progress in English at the bilingual class of RSBI in SMPN 1 Rambatan.

G. Significance of the Research

It is hoped the result of the research can be helpful by the teachers to notice some misunderstanding related to the ways in providing and presenting the materials in English, improving students' Science vocabulary mastery in English, vary the teaching activities in English and assessing the students' progress in English. It is hoped this research can improve the quality of teaching learning processes in handling the problems that may face during the teaching learning processes of bilingual class in SMPN 1 Rambatan, Tanah Datar. Moreover, it is also hoped that this research will give contribution to the headmaster of the school and the school administrators as the policy maker for a better decision to the school development.

H. Definitions of Key Terms

1. RSBI: stands for Rintisan Sekolah Bertaraf Internasional that means Pioneering Standardized School. This school uses English for 75% and Indonesian for 25% in teaching learning processes (bilingual class).
2. Natural Sciences: Science is generally defined as a set of concepts and relationships developed through the processes of observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena. Through scientific inquiry, students develop learning processes inherent in thinking: observing, classifying, comparing, communicating, measuring, inferring, predicting, and finding space and time relationships.
3. Teaching science in English: Use English as the medium of instruction in developing the students' processes of observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

A. Conclusions

Based on the research that has been done, the researcher got several conclusions as follow:

1. The teachers still not have not effectively provided and presented scientific materials in English. Actually, the teachers already had some natural sciences materials in English from some sources like internet articles and textbook. They also presented the materials in media related to the use of English in Science. However, they still rarely introduce English specifically to the students. For example, the key terms of Science in English were rarely spoken and written by the teachers while teaching learning processes. Thus, the important of English at bilingual class can not be seen because the materials were focused on the content only. Actually, the problems in presenting and providing the materials of Science in English can be solved by the collaboration of the Science and English teachers of the school. However, the limited of times and the unwilling of the teachers to learn a new language like English related to some physical factors of the teachers make this collaboration could not run effectively.

2. The teachers seldom conducted the activities that could improve students' vocabulary mastery in teaching Science at bilingual class although all of them agreed that English science vocabulary was important for students' achievement in the science class. Science teachers with limited abilities in English should find some strategic ways where they can teach Science in English with limited spoken of English. During observation and interview, it was known that the teachers had no idea how to improve the students' vocabulary mastery at bilingual class. Some training related to the use of English in RSBI that have done by some facilitators only focused on the ways in making syllabus and lesson plan. The teachers confessed that they were rarely introduced to the ways in teaching Science in English.
3. The teachers seldom varied teaching activities during teaching learning processes of natural science especially in extending the learning processes beyond the classroom. Actually, the teachers often asked the students to work in group or pair in doing the assignments at home. However, they didn't manage the students by some considerations such as partnering the students who are good and bad in English and Science. Then, the students' works on their bilingual books were also rarely checked by the teachers even they always asked the students to work with the book at home.
4. The teachers have always done continuous assessment. However, the techniques in assessing students' progress in both science and English were not varied. The assessment still often used Indonesian language while the semester examination conducted in English. Based on the observation

and the interview, the teachers' attentions at bilingual class were still on the content of the materials rather on the language function. Even they know that the use of English is important in bilingual class, they still rarely situated the students to the questions or testing of Science in English. It was not surprised the students got the unsatisfied marks in the examination of science in English.

B. Suggestions

The researcher would like to give the following suggestions:

1. If the government and the school want to keep going this program, they should do some efforts:
 - a) To improve the teachers' ability in teaching natural sciences in bilingual class especially in applying some important variables that influences the success in teaching natural science in English.
 - b) To strictly select the teachers who are capable to teach Science in English at bilingual class.
2. The pointed universities (facilitators) and the English teachers at the school should facilitate more intensively to help the science teachers to conduct the teaching learning processes in English effectively.

3. The educational department or the policy makers has to give more training to the science teachers about teaching English for specific purposes (teaching English in content area) so that the teachers have competencies in using English in teaching learning processes.
4. It is hoped that English Educational Department especially Balai Bahasa UNP broaden the scope of training for SBI/ RSBI teachers beyond syllabus, lesson plan and general English only. Furthermore, it is hoped that UNP provides a subject on how to teach English for Specific Purposes like science and mathematic or specially English for (Academic) Science and Technology (EST) course for the Limited English Proficiency (LEP) students.

BIBLIOGRAPHY

- Agus, S. (2011). *Memotivasi Orang Dewasa untuk Belajar. Perlukah?* Surat Kabar Wahana Media. Edisi ke 36/Tahun ke 11, Senin, 28 Maret 2011.
- Astika, A. (2008). *Model Kelas Bilingual di Sekolah Bertaraf Internasional: Sebuah Pemikiran Konseptual*. Retrieved on August, 2008 from <http://gurupembaharu.com/home/?p=2733>
- Baca, L. M (1991). *Bilingual Special Education*. reprinted from ERIC digest #E496.
- Brannen, J (1992). *Mixing Methods: Qualitative and Quantitative Research*. Brookfield: Avebury
- Cheong, L.K (1976). *Trends in the Linguistic Study of English for Science and Technology*. Richards, J.C. (Editor). *Teaching English for Science and Technology*. Singapore: Singapore University Press Pte. Ltd
- Crandall, J. (Ed.). (1987). *ESL through Content Area Instruction: Mathematics, Sciences, and Social Studies*. Englewood Cliffs: Prentice Hall Regents.
- Fiorito, L. (2005). *Teaching English for Specific Purposes (ESP)*. Retrieved on May, 11, 2005, from <http://www.usingenglish.com/teachers/articles/teaching-english-for-specific-purposes-esp.html>.
- Febrina, R. (2009). *The Teaching of Natural Sciences by Using English as the Medium of Instruction at the International Class of SBI in SMAN 1 Padang (Skripsi)*. Padang: State University of Padang.
- Gay, L. R. (1987). *Educational Research: Competences for Analysis and Application (3rd ed)*. Ohio: Meril Publishing Company.
- Harrabi, A. (2010). *Issues in education of English for specific purposes in the Tunisian higher education*. ESP World, Issue 2 (28), Volume 9, 2010, from <http://www.esp-world.info>
- Hasanuddin. (2010). December 13. *Bahasa Asing Jangan Jadi Pengantar Pendidikan*. Padang Express, page 1.
- Heinich, R. et.al. (1992). *Instructional Media and the New Technologies of Instruction (3rd Ed)*. Macmilan Publishing Company.
- Herr, Norman. (2007). *Strategies for Teaching Science to English Language Learners*. Retrived on February 13, 2007. From <http://www.program/teaching-ell.html>.