THE USE OF ENGLISH AS A MEDIUM OF INSTRUCTION BY THE BIOLOGY TEACHERS OF THE JUNIOR HIGH INTERNATIONAL STANDARD SCHOOLS

DISSERTATION

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STATE UNIVERSITY OF MALANG
GRADUATE PROGRAM IN ENGLISH LANGUAGE TEACHING
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Presented to
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CHAPTER I

INTRODUCTION

This present study is intended to describe the use of English as a medium of instruction by the Biology teachers of Junior High International Standard School *(SMP RSBI)*. This chapter is organized into the background of the study, the formulation of the research questions, the research objectives, the significance of the study, the scope and the limitation of the study, and the definition of the key terms.

1.1 The Background of the Study

Globalization has been affecting educational system in many countries throughout the world. One impact of the globalization is a shift to the use of English as a medium of instruction in the teaching of Science and Mathematics. This happens not only in the countries where English is used as Second Language (ESL) settings such as: India, Philippines, Singapore, Malaysia, and Hong Kong but also in the countries where English is used as a foreign language like Holland, Germany, Kuwait, Hungary, Saudi Arabia, Thailand, and Indonesia (DEPDIKNAS, 2006).

In the context of Indonesia, the policy on the use of English as a medium of instruction in Science and Mathematics classes was issued in the beginning of 2006. The policy was addressed to the schools that are legally nominated as *Rintisan Sekolah Bertaraf International (RSBI)* which have attained and executed *Standard Nasional Pendidikan/SNP* (the National Standard of Education) and is

added with X international aspects (X1, X2, X3, X4 ..). The X aspect refers to the education standard used in one of the country members of the Organization for Economic Cooperation and Development/OECD) or other modern countries which are assumed to have better quality of education and which appear to be internationally recognized for its education service reputation (General Directorate of Junior High School, 2006).

The use of English as a means of instruction in *RSBI* has initiated a long-running debate and polemic across the nation since 2006. The problems and the prospect of the program have been voiced in the media and in public forums. On the one side, the government is of the opinion that the use of English Science and Mathematics classes will be an added advantage to the students. Using English in Science and Mathematics classes can enhance and facilitate the language acquisition and the access to science and technology development (*Pengembangan dan Pembelajaran RSBI di SMP*, 2006: 4). On the other side, some people and classroom practitioners are of the objection to the policy. They are scared that the use of English makes the students' understanding of content get worse. They are worried about the possibility that teaching science and math in English make it difficult for the students to understand the knowledge of the subject matter. They are not sure that the use of English makes the students learn math and science better. They worry about the students' and teachers' competence in using English. The science teachers who are not proficient in using English can hinder the students' language learning achievement and their academic success as well. They believe the students' day-to-day language or Indonesian language is

the most effective instructional language for the students. In the domain of Natural Science, Science-Biology talks things and experiments around the students. The students will understand better if they are explained in the class using language that the students know best. If students are asked to learn everyday concepts in their day-to-day language or Indonesian language, they seem to understand more easily. From the teachers' interest, it will be easier to find out the students' difficulties in comprehending lesson by asking students to give everyday examples for the topic being taught using the language that they use everyday **(***Jawa Pos*, 22 February 2009; *Radar Blitar,* 9 July 2009; *Radar Tulungagung*, 13 September 2009; *Radar Tulungagung*, 27 Maret, 2010; *Jawa Pos*, 4 Januari 2012; *Jawa Pos*, 5 Januari 2012).

Some research reported the negative effects of the use of foreign or first language to students' understanding of content conducted by researchers in Indonesia Supriyatna (2008) and other countries (Salamon and Makinde: 2006; Kocakulah and Aysel: 2005). Their research findings reveal that the children can learn better in their mother tongue. Supriyatna (2008) reported the students' achievement in math and participation in the classroom activities are better when they are taught in the Indonesian language than those that are taught in English. His findings also show that the use of Indonesian during classroom activities is dominant. The students often speak in Indonesian when they ask their teacher and answer the given questions. In foreign countries, the studies of the same interest are done by Salamon and Makinde (2006). They examined the effect of Yuroba and English as medium of instruction to teach Biology toward the students'

Biology achievement. The research findings report the teaching of Biology using Yuroba is more effective than using English. The students' Biology achievement is better when they are taught in Yuroba (students' mother tongue) than when the lesson is delivered in English. Collier (see Baker & Jones, 1998, p 561) also claimed that literacy is most easily studied in home language. Forcing students to learn a subject in a second language may cause academic failure.

The same justification to the negative side effects of the use of English as a medium of instruction also asserted by UNESCO (2007) endorsing this formulation to the European and Asian countries to employ a mother tongue in education policy. The students' achievement in Mathematics and Science does not have any significant correlation with the English-medium instruction. It is stated that one way to lift the standard academic in Mathematics and Science is not by using English as medium of instruction but by fostering the methodical and critical thinking, and promoting academic rigor. For example, we can learn from the people of the Philippines. The majority of Philippines habitually use English in daily communication and in the classroom activities but they are not at top world rank in Math and Science. Meanwhile, people of other countries such as Taiwanese, Korean children, German, and Japanese do not learn Math and Science in English but the technology and science knowledge in these countries have developed well.

As the questions about the credibility of teachers' English proficiency raised and the polemics continued, the Ministry of Education and Culture responds positively to the critiques. Along with its legitimized policy which

abides (1) the 2003 National Education System Act (2) the law no.20, 2003's article 50, (3) the law no.33, 2004's is decentralization, (4) the law no 25, 2000's is about National Development, (5) the Decree of Minister of education no 19, 2005's article 61 is about Output Standard Competence(6) the Decree of minister of Education no 23, 24, 2004's are about the implementations of Decree of Minister of Education (General Directorate of Junior High School, 2006)), motivation and facilities are given to the Science teachers of *RSBI* to increase the quality of teaching. The teachers are invited to attend language trainings, seminars, English courses, and discussions held by the Association of Science and Mathematics teachers (*Musyawarah Guru Mata Pelajaran/MGMP*). The Ministry of Education and Culture prepares big grant for in-service and in-house trainings, regional, national, and international workshops; provision of the curriculum materials such as dictionaries, book references in English, grammar books, internet based learning facilities, teachers' guides and other materials. They are also facilitated with teaching multimedia such as laptops, LCDs, student books, dictionaries to conduct effective teaching (DEPDIKNAS, 2006).

The government's efforts to support the teachers' professional development through various trainings are relevant to the biology teachers 'needs. The Biology teachers' English quality is professionally needed because the teachers have several roles as educators, communicators and evaluators. In classroom setting, the teachers are the main actors whom the students rely on so they must possess the competences both in content of subject they teach and knowledge of language as also required by state certification standard in order to

conduct their job well. Like teachers of regular schools, the teachers of *RSBI* have to fulfill four basic teachers' competencies as stated in law no. 14, the article 8, chapter IV about Teachers and Lecturers, namely: pedagogical competence, personality competence, social competence, and the professional competence. In the context of science classes of *RSBI*, the teachers' requisite professional competence is different from the teachers of common schools. The teachers of *RSBI* have dual tasks mastering of content and English (DEPDIKNAS, 2006).

Despite the controversies, in 2008 there were more than 200 State National Standard Schools of Junior High School which were transformed into *RSBI.* In 2006, 100 pilot project schools met some requirements and criteria demanded by Monitoring and Evaluation Program (MEP) from the Directorate of Management of Junior High School. *RSBI* of the first batch is a kind of pilot project developed from the State National Standard School (*SSN/Sekolah Standard National*) which has already used English as a medium of instruction in the teaching of Mathematics and Science since 2004.

The Ministry of National Education and Culture has worked hand in hand with local government to run the *RSBI* and has spent a large amount of national and regional budget to prepare school facilities and teacher professional development. Aside from funding supports, public accountability has been done by the Directorate Management of Junior High School. Monitoring and evaluation program are regularly done in every semester. Besides, the Department of Education and Culture firmly urged each *SMP RSBI* has a big concern to implement eight standard operations which are regulated in a guideline book

entitled "*Pengembangan dan Pembelajaran RSBI di SMP*", (2006): (1) *RSBI* has to conduct teaching learning activities for Mathematics and Science subjects in English, (2) *RSB* has to keep using official language (Indonesian) to scaffold the students understand the content subject, (3) the Indonesian National Education System, and curriculum as well as being relevant to the Indonesian culture and values are applied, (4) *RSBI* is facilitated with modern Information Communication Technology (ICT), (5) *RSBI* has to cooperate with one foreign school holding the international standard as an overseas partner, for example Cambridge , in order to obtain the same accreditation as their overseas partnership. The international partnership is intended to increase the quality of graduates in order that they are internationally acknowledged, (6) the prescribed students' minimal TOEFL score is 400/ minimal English Rapport scores of 8 and the teachers ' score of TOEFL is 500 . (8) Exposure to English is mostly confined to lesson classroom. The development of other education aspects are based on the international standard criteria, which then makes *RSBI* different from other regular schools (see Appendix 10 for Eight Standards of National Education).

So, amid the controversies, immediate stakeholders of the schools tend to also have positive attitudes to the implementation of the policy on *RSBI*. The data obtained from the interviews with some head masters, coordinators and the Biology teachers of *SMP RSBI* Cluster IV in the preliminary (January 2, 2010) indicate that they see the policy of the language instruction as basically an emergent response to current needs. The significance of English in the context of global politics, social aspects, and cultural, job competition is a dominant factor

that raises the students' and teachers' positive attitudes toward a prescribed mandatory requirement to have good English proficiency. The majority of the informants said if the graduates do not want to lose in the world competition they should have an ability to communicate using English. This kind of instrumental motivation, learning a language to attain job, and for academic success might be a powerful motor that is able to stimulate the students' motivation to learn English (Appendix 11, Extract 1).

The use of English as an instructional language in Science and Mathematics classes is purposely to equip the students with the English communicative competence to face the world's rapid growing development in education, economy, politics, social aspects, and culture through the subject they learn. English is not only language of communication of American and Englishmen but it has become the international language spoken by people around the world and much of the world's knowledge is recorded in this language. The use of English in teaching subjects other than English is a positive decision to respond to the world shifts by preparing the graduates whose competence internationally acknowledged. See Appendix 11, Extract 1 for the informants' attitude toward the use of English as a medium of instruction to teach Science-Biology.

Another finding of the preliminary study informs teaching science in English, in the long run, is believed benefit the students. The informants are of the opinion that the use of English in the classroom communication linguistically provides students more English learning experiences. The students get

opportunities to learn students' and the teachers' English , get drills to practice the spoken and the written English, to increase the motivation to enhance the knowledge of the content by reading the literatures which are recorded in English. The students can improve their English proficiency through the subjects they learn. The classroom language can enrich the students' mastery of vocabulary, grammar, spelling, pronunciation of English. The possession of these language components, later on, will contribute to process of acquiring English. See Appendix 11, Extract 1 for the informants' attitude toward the use of English as a medium of instruction to teach Science-Biology.

Integrating the language instruction and the content gives multiple positive impacts to the students. The oral communicative skill, writing skill, reading and listening skills can be developed through various classroom interactions. The students get the chances to practice using English. They talk about themselves, to their peers and to teachers in English. They get experience to read various learning materials such as student book and student worksheet. They often listen to the teacher' talks and write the experiment reports. Such English learning experiences will be meaningful to the process of mastering English. The students get a feel for what is correct and what is not correct from the interaction with their friends and teachers. The students, who habitually use English when they write, speak, read, and listen, by time, will be at the position of certain working level of English proficiency. See Appendix 11, Extract 3 for the advantages of using English as an instructional language**.** Such a model of acquiring a language once has been conceptualized by Krashen (1999). Krashen's Monitor Model (1982)

theorized that second language acquisition can only take place if there is comprehensible input and output. See Figure 1.1 for the conceptual framework of the English

Exposure and English production.

	Oral	Written
English exposure/Inputs.	The Biology teacher's talk (vocabulary, grammar and language function)	The Biology materials, published worksheet, and textbooks
The student's English production/Outputs	The student's communication skills: agreeing or disagreeing, clarifying, describing giving information, interpreting data, presenting work, and other.	The student's writings (print materials)

Figure 1.1The Conceptual Framework of the English Exposure and English Production

The policy of using English as a language of instruction is purposely to prepare the students' readiness to compete with the students of different countries to take part in the world growing civilization and facilitate the students to have an access to enhance the information and the knowledge through any source which are mostly disseminated in English language. The graduates who are equipped with both the academic knowledge and the English language competence seem to get prepared to face the rapid world progress and competition. It is quite possible that the graduates whose sufficient English communicative skills also have confidence to compete with the graduates of the foreign countries to access jobs and to undertake further study at higher education level in English speaking societies (DEPDIKNAS, 2006).

Some previous research studies reported the significance of the use of English as a medium of instruction to the students' language improvement. Teaching science in English (partly or fully immersion program) is believed to be

a vehicle to promote students to become proficient in English and increase a high level of academic achievement. Immersion program can stimulate to some extent native-like learning conditions by maximizing the time, the intensity, and the equality of learners' exposure to the target language and culture (Cohen, 1995). Research results on bilingual education conducted in North America revealed students who studied in bilingual education improve fluency and confidence when using English. They achieved good students' talks, mathematics and science skills (Lambert, 1972), (Swain and Lapkin, 1982), (Genesee 1983, 1987, 1991), and (de Courcy, Warren, & Burston, 2002).

A study conducted by Baker and Jones (1998) reported the use of English in teaching learning activities provides cognitive advantages in terms of creative thinking. They explained the single or more words used represent a single object or idea. The students became rich of thought. Besides cognitive benefits, the use of English as a means of instruction also helps the learners comprehend a language as system. The students can recognize language components such as phonology, syntax, vocabulary, and sentence and word meaning as well as use language for the different purposes.

In this regard, Fradd, S.H. & Lee, O (1999: 9-10) argued Science-Biology is a source of language learning for the students .Science-Biology is mostly based on inquiry, problem solving. Science-Biology is offered in words, loaded with terminology and concepts. The science classroom discussion is always embedded in language, which means that, when the students are learning science, they learn to speak, write, listen and read (Fradd, S.H. & Lee: 22). A similar view is

proposed also by Lemke (1990). According to him, Science-Biology is rich of words. Learning science means learning to talk language. Talking science means observing, describing, comparing, classifying, analyzing, discussing, hypothesizing, theorizing, questioning, challenging, arguing, designing experiments, following procedures, judging, evaluating, deciding, concluding, generalizing, reporting. Such cognitive thinking skills involve the use of words, language structures, and discourse features (see Extract 1.1 and Extract 1.2 for nature of the science).

Extract 1.1 Nature of the science characterized by critical thinking

> All living things respirate. Respiration is the process of breaking up food and giving of energy. Many living things take oxygen for respiration. The respiration process produces energy, water vapor, and carbon dioxide. The energy which is produced during the respiration is used for living processes. Carbon dioxide which is realized while breathing can be observed through following activity.
>
> (Department of National Education, 2007: 179)

Extract 1.2 Nature of the science characterized by problem solution

> One of the ways that we can do to know more about the interaction among organism in a population is by drawing a graph of population and analyzing them. Use the following data to draw the population graphics of owls and rats
>
> (Department of National Education, 2007: 237)

In the case of the significance of incoming language inputs to the process of language acquisition, Krashen (1982) stated that learning language in the classroom setting subconsciously could promote language development. Similarly, Swain (see Gass & Selinker, 1994) had a statement of an idea that comprehensible input which is necessary for language acquisition can come from the language produced by the learners. Furthermore, it is asserted second language acquisition does not only need comprehensible input sources like textbook but also students' engagement in meaningful oral exchanges in the classroom or community. Such axioms suggest that using language in real communication

facilitates the students to recognize whether the words and the grammar employed conform to the rules of English. They get feedbacks to develop their English fluency and accuracy. Regarding language acquisition principles, it can be clearly perceived that using English as a medium of instruction offers the teachers and also the students more opportunities to use English orally or in written form lecturing, giving comments, conducting discussion, presentation, interaction, doing evaluation, testing, all classroom activities involve the use of English (Krashen, 1982). The activities that involve the students' participation naturally contribute to the students' process of English acquisition (Krashen, 1982). Bialystock (1987a) stated "bilingualism sharpens language learners' ability to reflect upon and manipulate language as a system". This means the students who study using two languages can learn language component like phonology, syntax, vocabulary of the language instruction.

Needless to say, as key persons who have to impart knowledge, direct the students' behavior and instruct vocabulary in the classroom, the teachers' language competence and content mastery are absulotely needed. Two competences will have impact on the students' material learning success as well as language learning. In a domain of language competence, as communicators, the teachers must know how to use language for communication with students in the classroom. As educators who must be responsible for educational materials for students and activities in the classroom, the teachers need to know which classroom language they must use to promote the students' understanding of content and to avoid the students' linguistic obstacles to learn content. As

evaluators, the teachers need to understand the language needed in the classroom that they can justify the students' language and catch the message the students want to convey and make linguistics remedies whenever it is necessary. On the basis of such a thesis, being at the level of working English proficiency for the Biology teachers of *RSBI* become crucial. The Biology teachers' English competence is legitimized by the institution using TOEFL or TOEIC score by which the teachers have the right to teach (the Directorate of Management of Junior High School, 2007).

As noted earlier (introductory paragraph of Chapter I, p.1), the present study is focused on the English language used by Biology teachers. As such, this study touches on the issue of language competence on the part of the teachers. Language competence refers to the ability to use English correctly and appropriately for certain communicative intents in the context of instruction. The teachers whose communicative competence is good probably do their instructions effectively. Experts define the term communicative competence in different ways. Hymes (1972) wrote communicative competence as an implicit and explicit knowledge of the rules of grammar and contextual or sociolinguistic knowledge of rules of language in context. He mentioned four aspects of communicative competence: what is formally possible, what is feasible, what is the social meaning or value of a given utterance, and what actually occurs. Canale and Swain (1980) defined communicative competence in the context of second language teaching. They synthesized communicative competence as a synthesis of knowledge of basic grammatical principles, knowledge of how language is used in

social settings to perform communicative functions, and knowledge of how utterances and communicative functions can be combined according to the principles of discourse.

Canale and Swain (1980) classified communicative competence into grammatical competence, sociolinguistic competence, discourse competence, and strategic competence. Grammatical competence, today it is usually called linguistic competence means the acquisition of phonological rules, morphological rules, syntactic rules, semantic rules and lexical items. Sociolinguistic competence refers to the learning of pragmatic aspect of various speech acts, namely, the cultural values, norms, and other socio-cultural conventions in social contexts. The aspects of various speech acts include the context and topic of the discourse, the participants' social status, sex, and age, and other factors which influence styles and registers of speech. Since different situations call for different type of expressions as well as different beliefs, views, values, and attitudes, the development of sociolinguistic competence is essential for communicative social action. Discourse competence is the knowledge of rules regarding the cohesion (grammatical links) and coherence (appropriate combination of communicative functions) of various types of discourse. Canale and Swain (1980) emphasized that sociolinguistic rules of use and rules of discourse are crucial in interpreting utterances for social meaning, particularly when the literal meaning of an utterance does not lead to the speaker's intention easily. Strategic competence is to do with the knowledge of verbal and nonverbal strategies to compensate for breakdowns such as self-correction and at the same time to enhance the

effectiveness of communication such as recognizing discourse structure, activating background knowledge, contextual guessing, and tolerating ambiguity.

Gottieb (2006) identified that Academic Language proficiency centers on the delivery of understanding of an idea or message through one or more language domains; listening, speaking, reading, or writing. It generally involves three criteria: (1) comprehension and use of the specialized or technical vocabulary and language patterns associated with content, (2) linguistic of complexities of variety and length (phonology, syntax, and meaning), (3) demonstration of understanding or use of language system such as phonology, the grammatical structure, and the meaning of the language.

Meanwhile, Stern (1983) claimed language proficiency as the actual performance of learner in a given language, it involves the mastery of (1) the form, (2) the linguistic, cognitive, affective and sociocultural meaning of those form, (3) the capacity to use the language with focus mainly on communication and attention to form. Language proficiency is associated with communicative language ability involving linguistic proficiency and communicative proficiency.

Bachman (1990) argued language proficiency reflects how well one can use the rules of use of language and the rules of speaking in communication in specific situation setting purpose activities Language proficiency is individual's competence to use language or an expression of students' linguistic knowledge and language use in four language domain, reading, writing, speaking, and listening in and outside school contexts and interaction.

Cummin (1992) classified language proficiency as the acquisition of Basic Interpersonal Communicative Skills (BICS); language of social interaction/conversational language such as greeting, make salutation, share feeling, apologize or make regret, offer compliments, asking things, requesting assistance, and Cognitive Academic Language Proficiency (CALP). CALP refers to the language patterns and concepts required in processing, understanding, and communicating Based- Content Curriculum. CALP is the language used by a teacher and student for the purpose of acquiring knowledge and skills, describing abstract idea and delivering students' conceptual understanding such as the language to argue, debate compare, contrast, synthesizing, drawing conclusion, convincing other people, giving information etc.

Wellington, J. & Osborne, J (2001) made three categories of words used in classroom language. First, High frequency general words (words that are used regularly in everyday context: look, make, taste, fine, hungry, angry, and other). Second, Non- specialized academic words (words that are used across content area: examine, cause, soil, air, conduct, win, insect, taxonomy, enzyme, colony, anatomy, artery, pigment, death rate, and other).Third, Specialized content area words (academic words unique to specific content area/conceptual terminology of science: biodiversity, sepsis, mutate, chromosome, embryo, heredity, pollen, cutting, bulb, herbivore, and other).

In the present study, the language competence refers to the Biology teacher’s competence to put the knowledge of linguistic components in appropriate instruction in the Science classroom. The linguistic competence

covers the richness of the vocabulary and the ability to use the vocabulary, grammar of English, and language functions. Knowing linguistic competence to convey idea and thought is not enough for the Science teachers because language is not simply a matter of form but also of function. Holmes (1998) said language serves the meaning depends largely on the people whom the language addresses, setting, purpose and topic. The language use should regard to its context appropriateness: grammatically, semantically and culturally is acceptable. Widdowson (1983) stated that knowing language is more than how to read, to write, to understand, to speak but how sentences are used to communicate.

In this regard, the ability to use language function appropriate to its function is also the job of the Biology teachers. The Biology teachers are not only supposed to possess the knowledge of vocabulary and English grammatical rules but they have to prepare themselves with ability to use English in various instructions. The teachers have to have knowledge of phonemes, morphemes, words, phrases, sentences, discourses for purpose of the language arbitrariness and politeness. The possession of knowledge of language components helps the Biology teachers be able to produce grammatical English. The accurate or appropriate use of vocabulary and grammar, then, produces well formed English which probably can be understood by the students.

Communicating ideas, feelings in language to other people does not only need mastering linguistics knowledge for linguistic competence and socio-cultural aspects dealing with “When to speak, what is talked, with whom, where, in what manner” but also need to comprehend the functions of language. The language

functions are the purposes for which people speak or write (Brown, 1987). Whenever people use language, they have some purposes. People use language to communicate with others, promise, complain, agree, admire, and give an information and so forth. In the present study, the language function refers to the function of English for the instructional purposes. The Biology teacher uses English to have personal conversations such as greeting and appreciating the students 'works, directing the students' physical behaviors, directing instruction, imparting theories, and helping the students understand the vocabulary.

In many cases when people use sentences in their communication they mean more than what they do actually say. Furthermore, listeners understand meaning directly or indirectly conveyed by the sentences they produce. The same case happens to what science teachers do with the language of classroom. The teachers' English which is delivered to the students within the teaching stages convey several purposes namely: greeting, appreciating the students' work, giving feedback, asking the students do activities, giving tasks, and among other. Austin (1962) was of the opinion that in uttering a sentence, a speaker involves three different acts: locutionary act, illocutionary act, and perlocutionary act. The first is the actual utterances with a particular meaning. For example, "that is a great experiment". This sentence performance with a particular meaning is so called locutionary act. The second refers to the speaker's communicative intention in producing the utterance (illocutionary). Illocutionary act indicates what a speaker really intends by his words, sentences spoken out. Consider the sentence: you will

get “D” for Mathematics. The speaker may expect the sentence is interpreted as a threat.

There are many kinds of illocutionary such as assertion, request for action (imperative) and request for information (question). The illocutionary force is sometimes merely implicitly in utterances but in many cases illocutionary force is made plain (explicitly per formative utterances). Consider the sentence: can you turn write down the answers on the whiteboard? Linguistically this sentence is a question (yes/no answer). In broader sense, the sentence could be an imperative. The use “down” can represents only an intention of request for action. The third refers to the act in order to achieve a certain consequent response from the hearer (perlocutionary). Considering this view, similarly, to build up the communication with the students, the Biology teachers are not only merely demanded to have knowledge of linguistic and sociolinguistic but also ability to use English sentences which can represent intended purposes.

Every language has various kinds of function. The different languages express those functions in different ways and contexts. There are over a hundred functional heading in English. In relation to an individual’s need, for example, sociocultural language function is dominant. In the academic contexts, every teacher needs to communicate with the students. He/she needs a particular language function such as a personal, interpersonal, directive, referential, and imaginative. He/she learns to use language of expression of greeting, requesting, apologizing, and getting direction, giving information (Finocchiaro, 1983).

Language is also used for the direct expression of feeling, as a mean of investigating reality, a way of learning about things, a means of communicating about something, of expressing proportion (Halliday, 1973). According to him language punctuates as various instruments mentioned as follow: an attitudinal tool like expressing likes and dislikes, saying pleased or disappointment, etc.; active (advising, refusing, suggesting etc.); textual (questioning, finding meaning, correctness etc).

The concept of language function was mentioned also by Van Ek's (1980). Language serves functions of imparting and seeking factual information (identifying, reporting, describing, narrating, asking, correcting; expressing and finding out intellectual attitudes (expressing agreement and disagreement, inquiring, offering, denying); expressing and finding out emotional attitudes, hope, satisfaction, pleasure, worry, fear, desire); expressing and finding moral attitudes (regret, granting forgiveness, approval and disapproval); getting things done (suggesting, inviting, warning); socializing, greeting, meeting people. Due to diverse needs of this language function in the science classes, the science teachers have to possess ability to speak, to write, to read, and to listen. They must be able to use language for as starting lesson, giving assignment, checking students' understanding, giving everyone's attention, correcting error, encouraging and so forth.

Cummins (1981) suggested two kinds of language ability that should be acquired when science taught in foreign language or second language. First, the science teacher has to have Basic Interpersonal Communication skills (BICS)

BICS is needed in interpersonal relations or in informal situation. BICS is the day-to-day language needed socially with other people. The language can occur in the playground, lunch room, the school bus, sport area etc. Social interactions are usually context embedded. They happen in a meaningful social context. They are not very demanding cognitively meaning that they are not dealing with synthesis, drawing conclusion, inferring. The language is not specialized. The language is face-to-face conversations (verbal language), for instance, nonverbal features like gestures, body movement, and facial expressions all convey meaning and aid understanding. Due to contextual support, a second language is more easily acquired in this 'context-embedded' situation. However, a student's good performance in BICS is not a predictor for her/his success in schools.

Second is cognitive academic language proficiency (CALP). Cummin (1981) defined CALP is a kind of language proficiency to make sense of and use academic language in less contextual situations. CALP is required in the classroom, where higher-order thinking skills (analysis, synthesis, evaluation, etc.) are involved, the language is frequently more formal, more technical, more specialized, and more abstract—'disembodied' from a meaningful, supporting context. This 'context reduced' classroom communication (in listening, speaking, reading, and writing) would certainly pose more difficulty to students and teachers in acquiring language and literacy in English. Even if they have adequate literacy skills and strategies in Indonesian (top-down processing)—and these are transferable to English, still they are not sufficient conditions for a thorough comprehension of texts in English, for instance. Adequate knowledge of language

and skills in English vocabulary, grammar and orthography are also necessary components for a full understanding.

Teachers' instruction is categorized into the application of instruction (directing the students' behavior and directing the students do activities in the classroom), the science instruction (teaching theories and concepts), and vocabulary instruction (helping the students understand vocabulary). The language of the teachers plays an important role in three mentioned instructions. The success of the teachers' communicative intents depends much on the language the teachers use. The choice of words and forms of language affects the students' understanding of what the teachers have told. On the basis of this perfective, the possession of the teachers' ability in using effective language for the instructional purposes is a mandatory requirement.

Academically, the teachers' low language proficiency potentially causes academic problems. Their teaching processes probably run inefficiently and ineffectively. The teachers who are not orally proficient in English will be rendered incompetent to perform one of their chief roles, lecturing. Pauses, hesitancies, wordiness, and grammatical, lexical, and pronunciation inaccuracies may characterize much of their explanation, and this certainly will slow down or even hamper their students' understanding of the content of instruction. Teachers' poor ability in reading comprehension of English textbooks and an essential source of information for them may cause them a lack of understanding or even a misunderstanding, which in turn may result in misinformation, an effect damaging to students' academic development (DEPDIKNAS, 2006).

Since classroom is a community, various language functions can be expected to occur there. Teachers are likely to perform not only giving information but also soliciting answers, checking comprehension, encouraging, suggesting, stirring, persuading, and so forth. All of which are essential to create a lively class and establish a good image as the professional teachers. Teachers who have difficulty in expressing themselves would be reluctant not only to ask questions (academic) but also to initiate and develop interpersonal relationship with their students. Such a thesis is proved by previous research findings. A research by Ismuninggar (2009) on the use of English as an instructional language by a physics teacher reveals 50% of lesson delivery uses Indonesian language. Another research also reports when the physics teacher guiding the students in experiment classes all instructions using Indonesian language. English use was only about 30%, the teacher is impeded with English. Many grammar mistakes were identified in her lesson plan (Prajarisma, 2009). In addition, the studies on the use of English in the Mathematics Teaching and Learning of the International Standard Class at *SMPN I* Malang conducted by Dwijayanti (2008) found the Mathematics teacher does not use English persistently, but apply translations, code switching and code mixing. The Mathematics teachers' instructions are frequently done using Indonesian. Semiun's research on the use of English as a medium of instruction by Senior-High School EFL teachers in NTT (2009) found the code switching and code mixing between Indonesian (32%) and English (68%) used to solve the instructional problem.

The sudden change in medium of instruction for teaching science and math from Indonesian to English will pose challenges, particularly to Mathematics and Science teachers. The first reason is that English is a foreign language in Indonesia. The second reason is teaching science-using English is a new thing, therefore it is a challenge for teachers because their previous professional experiences have largely involved the use of first language and so have the students. Indonesian teachers of science have been using Indonesian language for years in their teaching and the students have been studying science in home language, Indonesian. They are most conversant in Indonesian. Thus, teachers' and students' competence is Indonesian not English language. See Appendix 11, Extract 9 for the difficulty in understanding the language of science.

The fact that science teachers still have a problem in English proficiency has been discussed by previous researchers not only in Indonesia but also in foreign countries. The findings of preliminary identified that the science teachers and the students lack language skills. The discussion highlighted that weak proficiency of English hindered the teaching and learning content of subject. One example is that learning mathematics and science at Philippine schools have become consequently more difficult, as these subjects are taught in a language that is not fully comprehensible to the students (Smolicz, Nikel, and Secombe, 2006). Second example, Hong Kong Chinese students faced difficulty in having to master two languages and to learn content subjects via the medium of a foreign language. Later it affected not only the quantity but also the quality of learning (Bickley,1990 in Tsui, 1996).

Accordingly, it can be inferred that English as a medium of instruction was only good for students and the teachers who were competent in English because they could use their high-level cognitive strategy. Otherwise, it disadvantaged to students of low English competence. Also in China, particularly those of lower academic ability, would learn more effectively and achieve better results if Chinese is used (Chinese Education Department, 1998). In Malaysia, English medium of instruction has been a long national debate since 2003 because some groups of people are discouraged that English is going to replace the national language of Malay (Tan, 2005) in Jawa Pos (6-8-2009) and finally the government made current decision to quit using English as a medium of instruction and went back to use Malay as the medium of instruction in schools.

The language in science is unique. It is quite different from the general English (day-to-day English). It contains multiple semantic languages which are not easy to master. The language in science is decontextualized, more abstract than social language meaning that the events or topics being described to the students are difficult to understand and there are little or no opportunities to negotiate meaning. The scientific terms, whether technical or non-technical are unique in nature. They are seldom found in other context in English as a second Language instruction (Rosenthal, 1996, Henderson and Wellington, 1998 and Jarret, 1999).

The uniqueness and complexity of language in science often make many science teachers difficult to help the students understand the content of subject. Science teachers need not only confidence to be able to mediate the scientific

contents but also to mediate language. To tackle the language barrier and the communication breakdown in the classroom interaction, the informants who are given a question in the preliminary study (January11, 2011) said they applied the strategy to help the students understand the content of materials they offered. To reduce the instructional problem at the different teaching stages, they used "Wh" questions (what, why, where, how, what kind of…? what do you think of…? what are the examples?). The use of these simple question words were supposed to successfully scaffold and promote the students' thinking and enable the Biology teachers peer feedback, explain things, and extend the knowledge, instruct the students. An informant interviewed said that "I always use a simple and common English word with the simple sentence pattern so my students can understand what I am talking about. I avoid using very complicated sentences". The informants knew the simple and common English was understandable to the students. Using a common language structure encouraged the students to participate in the learning activities the classroom and developed the students' communicative skills. See Appendix 11 no 8 for the teachers' strategy to solve the instructional problems.

Additionally, to scaffold the understanding of the knowledge of content and language, the teacher broke down the task into the sequence of phase, created the students' interest, gave the constructive feedback, provided the language glossaries in English and Indonesian, used Indonesian when the English was not easy to understand. To assist the students develop the learning strategies, the Biology teachers made draft lesson materials, identified the key content

vocabulary, set the learning goals, used the visual prompts to aid the students' memory, reviewed the work. They did also the consolidating learning by monitoring what had been going on during learning process , reminding the task assigned, repeating what they said, reviewing the materials deliver. See Appendix 11 no 8 for the teachers' strategy to solve the instructional problems.

Repairing teaching strategy was another possible way out. They did the English repetition and the paraphrasing both in the Indonesian and the English language. They often practiced the translations from English to Indonesian or on the way around when their English was not understandable. Translating from English to Indonesian was done to negotiate the meaning to reach the communicative intents and to avoid misconceptions and misinterpretations or miscomprehensions. The translations from English to Indonesian were intentionally done as a scaffolding strategy to help the students understand well the concept being delivered. They realized that the content understanding was absolutely focused on. They did not want to sacrifice the students' understanding of content only because of the use of English. In this regard, the teachers were tolerable and permitted by the regulation of *RSBI* to use Indonesian or Javanese if the content was difficult to explain in English. The use of Indonesian or Javanese was an alternative to help the students' understandings. See Appendix 11no 8 for the teachers' strategy to solve the instructional problems.

They, even, did a scaffolding strategy by providing the diagrams, the charts, the pictures, the real objects, the practical demonstrations and sometimes avoided an English and switched to Indonesian. This is an example of the Engish -

Indonesian translation spoke by a teacher (T8) "*Population is a collection of individual in a similar place. Apa individu? Individual is organism that lives individually. Individu adalah organisme yang hidupnya sendiri"*. The following is a sample of pictures representing a marine- ecosystem, deer-ecosystem and a graph of population density used as scaffolding. See appendix 11no 8 for the teachers' strategy used to solve the instructional problems.

Concept for integrating content instruction and language (Crandall, 1999), Language-Sensitive-Methodologies (Marsh, 2002), Content-based Instruction (CBI) which is also known as Content and Language Integrated Learning (CLIL) by Marsh (2006) or Lemke's (1990) are probable practical alternative. Science teacher can address vocabulary and technical terms by the use of integrated language functions such as summarizing, rephrasing, classifying, using diagram has part missing (words, phrases or label deleted), and using worksheets and graphic organizes.

Lemke (1990) suggested the science teachers to see that science is rich of words and terms. Technical terms are used to define concept, describe objects, and to explain phenomena. It is unrealistic to expect the students to acquire them without any formal teaching in communicative context. Ideally, new vocabulary words should be introduced when needed to clarify thinking and promote effective communication because it is essential to convey meaning to the students, and then, to check their understanding. Lemke is of the opinion that the teachers who teach science mean that they do with language: describing, classifying, comparing, questioning, arguing, evaluating, judging, and concluding and so on.

To perform these activities, the science teachers must not only understand the scientific concepts and but also be able to know related vocabulary and be able to use the acceptable and true English grammar. The science teachers' strategies are giving the opportunities to the students to think and to communicate, promoting language environment to second language development by providing extensive use of teacher talk, body language, realia, visual, explicit modeling by the teacher and introducing and teaching vocabulary words.

Henderson and Wellington (1998) reported Directed Activities related to text (DARTS) such as texts, tables, and diagrams with parts missing (words, phrases or label deleted) have been successfully applied to guide the students to understand content delivered. Meanwhile, Crandall, J.A., & Willetts, K. (1986) reported the language-sensitive content enables the teacher to facilitate both content learning and language acquisition for the students. Sequences of classroom activities are centered on the students the teacher's command. The students are asked to conduct experiment, to write report and present it orally. The teachers use teaching media like pictures containing content being taught and employ WH-questions to check the students' understanding.

Referring to the overall discussion which covers the theories of language acquisition, the advantages and disadvantages of the use of English as a medium of instruction to teach other subjects reported by the previous studies, the controversies emerging in the Indonesian society, the constrains faced by the majority Biology teachers, several attempts done by the Indonesian Government to support *RSBI* , the Biology teachers' professional development, the researcher

is motivated to conduct the research on the use of English as a medium of instruction by the Biology teachers of the Junior High International Standard Schools (*SMP RSBI*).

The underlying reasons of choosing the topic of study are based on the significance of topic, the theoretical and practical feasibility. The study is theoretically feasible, because, for one thing, design of research applies a qualitative method. The data are expected to demonstrate the facts about the English the use of English as a medium of instruction, particularly vocabulary, grammar of English, language function across the instructional contexts. For another thing, practically the fieldwork procedure to get the data within the researcher's reach because the study was conducted in *SMP RSBI* of the districts in western area of East Java Province where the researcher lives. Beside the research feasibility and practically, the choice considers the agenda that are implemented by *SMP RSBIs* of Cluster IV are not diverse from the agenda nationally done as prescribed by the Indonesian Ministry of Education and Culture. It is quite possible that data found in my research sites available in other sites of different cluster. Last but not least, to the best of the researcher's knowledge, there are not any researches found reporting the use of English as a medium of instruction focusing on the analysis of vocabulary, the grammar and the functions of language. The previous studies reported the intensity of the use of English (Semiun, 2009), the teachers' English proficiency (Dwijayanti, 2008), and the development of English test for Junior High School of *RSBI* (Fardhani, Aan Erlyana, 2011).

1.2 The Formulation of the Research Questions

Regarding the background of the study, the focus of research is formulated in the general research question as follow: “How English is used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction. This general research question is, then, elaborated into the specific research questions.

- What language features of English are used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction?
- What vocabulary of English is used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction?
- What grammar of English is used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction?
- What language functions of English are used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction?
- What language function of English is used by the Biology teachers in certain application of instruction?
- What language function of English is used by the Biology teachers in science instruction?
- What language function of English is used by the Biology teachers in vocabulary instruction?

1.3 The Objectives of the Study

Referring to the formulated research questions (see section 1.2), the present study is generally intended to explain how the English is used by the Biology teachers as a medium of instruction. Specifically, the research aims at describing:

- The features of English which are used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction.
- The vocabulary of English which is used by the Biology teacher to achieve the instructional purposes s in certain contexts of instruction.
- The grammar of English which is used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction.
- The language functions of English which are used by the Biology teachers to achieve the instructional purposes in certain contexts of instruction.
- The language function of English which is used by the Biology teachers in certain application of instruction?
- The language function of English which is used by the Biology teachers in science instruction?
- The language function of English which is used by the Biology teachers in vocabulary instruction?

1.4 The Significance of the Study

The study is directed to a particular case related to the good practices in using English as a medium of instruction to teach Science-Biology at *Junior High School at International Standard School (SMP RSBI*). The research findings are expected to give contribution, theoretically, to enrich the previous thesis on the use of English as a medium of instruction to teach any sciencee. Practically, the findings will be valuable to the Ministry of National Education and Culture in Indonesia, the other Biology teachers, the students, the English teachers and the other researchers in the field of English language teaching.

Theoretically, the findings of the research can serve a contribution to body of knowledge. The research findings which represent various types of the use of vocabulary, grammar and functions of English embedded in the discourses can be valuable to add a set of collections of words and grammar of English which are effective for the instructional language in the science classes of the country where English is learned as a foreign language.

Practically, since the policy on the use of English as an instructional language has been newly implemented for the last four years, the findings can be used by Department of the National Education and Culture as feed back to make the program run better and to improve the language competence of the Biology teachers. The findings enlighten and boost the confidence among the Biology teachers and the students. The findings show to the Biology teacher the use of the understandable vocabulary, the simple and correct grammar and the appropriate functions of language which successfully make the instructions comprehended by

the students. Besides, the empirical evidences which delineate the Biology teachers' teaching experiences in using English to teach Science-Biology is expected to shed lights the Department of National Education and Culture on how develop teachers' pedagogical competence or improve the science teachers' English proficiency by providing the effective language trainings.

To the students, the findings may give the motivations and the spirits. The students get the knowledge of vocabulary, the grammar and the language functions used by their teachers and peers. The students see also that the use of English as a medium of instruction is not something worried. It is proved that their science understanding does not get worse although the instructions use English.

Furthermore, the research findings lead the Biology teachers and the English Teachers to learn some features of assessible English for the certain instructions, notably the vocabulary, the grammar and the language function in Science-Biology and to learn how to use words, to combine the words into the complex and the correct sentences to successfully perform the various language functions like observing and describing various objects of study, hypothesizing, theorizing and explaining natural phenomena, a well as to understand scientific texts.

In addition, the data or the empirical evidences can be inputs for the other Biology and the English teachers to improve the quality of teaching skills. In this way, other Biology and English teachers can learn, adopt or model the good practices of using the English vocabulary, grammar, and language function in the

science classes as used by the three observed Biology teachers. Even the other Biology teachers can develop more advanced vocabulary, language structure and discourse in Science-Biology. Besides, other Biology teachers can learn the efforts taken by the three observed Biology teachers to improve their English competence. The data collected from the interviews indicate the three observed Biology teachers actively participate in the regional, national or international seminars, language training, sandwich, and self-learning to make their English better (Appendix 12).

Since this research covers only limited lesson delivery, for the other researchers, they can use the findings of my study as a reference to conduct a further study on the detailed vocabulary, grammar, and language function of English used in the instructions. For the other researchers, it is also quite possible the research interest may be directed to examine the influence of the use of English as instructional language toward the students' English mastery of vocabulary, grammar and the students' improvement in four English language skills.

1.5 The Scope and the Delimitation of the Study

The present study is limited to describe the use of English as a medium of instruction by the Biology teachers of *Junior High School of International Standard School (SMP RSBI*) grade level year 7, semester one in the area of the Western East Java Province which is labeled as Cluster IV. The zones are *Madiun, Nganjuk , Kediri, Pare, Tulungagung, Trenggalek, Pacitan, Blitar, and Ngawi.*

The scope of the study covers the description of the oral use of vocabulary, the grammar, and the language function of English by the Biology teachers.

1.6 The Definition of Key Terms

To avoid the misunderstanding of the terms used in this present study, there are a number of words or phrases need to be explained.

1. The use of English refers to the use of English refers to the oral English of the Biology teacher in the certain contexts of instruction.
2. Medium of instruction refers to a tool or an instrument which is used by the Biology teachers while conducting three contexts of instruction: (1) the application of instruction (directing the students do the activities in the classroom and the students' behaviors), (2) the science instruction (imparting theories, concepts, knowledge, information and facts) and (3) the vocabulary instruction (helping the students learn vocabulary).
3. Communicative competence refers to the Biology teachers' working English proficiency appears within the various instructional purposes in the science classes. The variables of the Biology teachers' working English proficiency are manifested through the vocabulary and the grammar mastery (grammatical knowledge) and the ability to use English suitable for its functions (functional knowledge).
4. The Junior High International Standard Schools refer to *SMP RSBI* (*Sekolah Menengah Pertama Rintisan Sekolah Bertaraf International RSBI). RSBI* is a school which has attained and executed *Standard Nasional Pendidikan/SNP* (the National Standard of Education) and is added with X international aspects

(X1, X2, X3, X4 ..), while the X aspect refers to the education standard used in one of the country members of the Organization for Economic Cooperation and Development/OECD) or other modern countries which are assumed to have better quality of education and which appear to be internationally recognized for its education service reputation (General Directorate of Junior High School, 2006).

CHAPTER II

RESEARCH METHOD

This chapter reports the method of the research which guided the researcher to collect the data to answer the research questions. The chapter is organized into: the descriptions of research design, role of the researcher, setting of the study, source of data, method of data collection, data analysis, and trustworthiness of the data.

2.1 Research Design

The research design refers to the whole plan of the research. The plan is orderly organized into activities done within the research phases to get the insights of the topic on the use English as a medium of instruction by the Biology teachers of *SMP RSBI*. Considering the research purposes, the researcher employed an ethnographic qualitative approach following O'Toole's principles (2010). O'Toole (2010) conceptualized, when ethnographic method was used, the researcher studied in the natural setting, constructed portraits of cultural life by studying an aspect of the social world intensively. The researcher described the documents and interpreted the human experiences in site of research through the field works. Under this view, the ethnographic approach was chosen in this study because it enabled the researcher to explore the habit of using English as a medium of instruction by the Biology teachers of *SMP RSBI* at Cluster IV. The exploration of the use of English by the Biology teachers was conducted by

observing the classroom teaching practices and interviewing the Biology teachers how they experience using English as a medium of instruction. See Figure 2.1 for the research design.

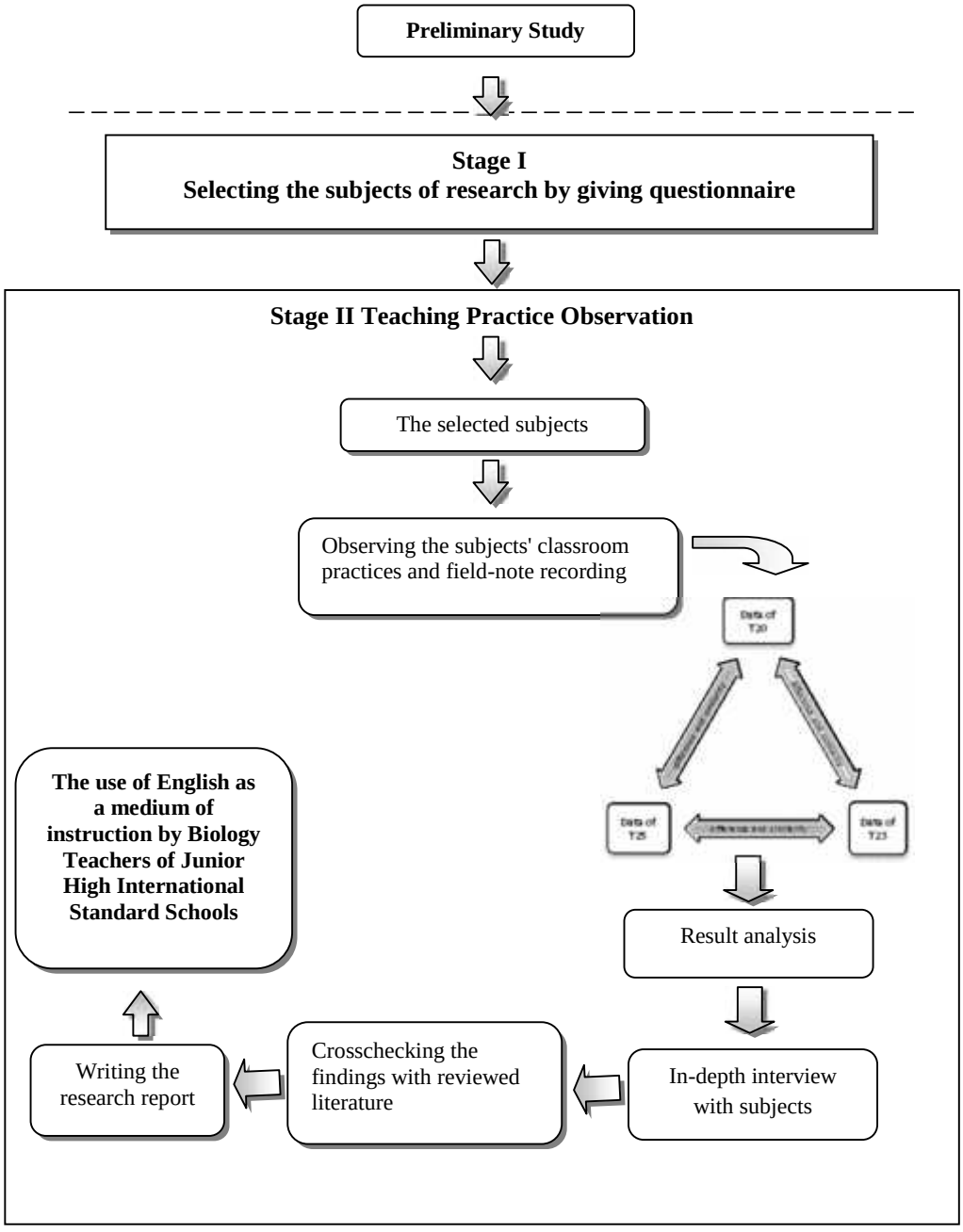

Figure 2.1 Research Design

2.1.1 Research Procedure

Method of the study used ethnographic qualitative approach (See 2.1). The method choice was based on the main objective of the research which aimed at describing the use of English by the Biology teachers as a medium of instruction to teach Science-Biology to the year 7 students of *SMP RSBI*. The research was preceded by a preliminary study. In term of data collection, the research is divided into two stages: stage of the subject selection and stage of the observations of teaching practices. Stage I employed a quantitative method whereas stage II employed a qualitative one.

Stage I is used to distribute a questionnaire to 32 Biology teachers of the 7^{th} grade of *SMP RSBI* at Cluster IV to select the subjects of teaching observations. The subject selection was based on two criteria that were set up by the researcher. The research subjects were selected from the Biology teachers who had the positive attitudes toward the use of English as a medium of instruction. The parameter to measure the Biology teachers' positive attitudes refers the ranking of the subjects' questionnaire achievement. The questionnaire survey was used to select the subjects of research because, first, it is not feasible for the researcher to conduct the observations of teaching practices in the classes of all Biology teachers of the 7^{th} grade at Cluster IV. Second, *SMP RSBI* of any clusters in East Java Province executed the same National Standard Operation Procedures (SOP) for *RSBI* but teachers' attitude toward the policy of the use of English as a medium of instruction was supposed to be different from one teacher to another.. Beside the questionnaire, the researcher crosschecked the selected subjects with

the result of interview with the headmasters of *SMP RSBI*, the coordinators of *SMP RSBI*, the Biology teacher's colleagues to make sure that the selected Biology teachers were the targeted subjects.

The researcher set up two qualifications to determine the subjects of the research. First, the Biology teachers had to have a positive attitude toward the policy of the use of English as a medium of instruction. The subjects' positive attitude was used as a criterion to select the subjects because the Biology teachers whose attitude was positive or good they are supposed to believe in the significance of the use of English as a medium of instruction. By such a belief, it was quite possible that the Biology teachers had a good interest or motivation to use English as their instructional language. It was equally important that the teachers' motivation lifted up the students' interest on the subject they learn. The students' attitude towards the subject could be positive. By this situation, they learned more, their marks were better. Besides, the teachers' belief in the significance of English as a medium of instruction was needed because their English had very important role as a tool to deliver the knowledge and to do various instructions. It is using English the Biology teachers mediate the students' understanding. Through English the Biology teachers used the students constructed their knowledge or reality. The results of the questionnaire were used to rank the likelihood of the selection of the targeted subjects.

Second, the research subjects were selected from the Biology teachers who had English competence to teach. The parameter to measure the Biology teachers' English competence was TOEIC score document. The researcher relied on TOEIC

score document because none of the Biology teachers in Cluster IV achieved the benchmark of the English competence standard which is based on the TOEFL minimal score of 450 or the intermediate level prescribed by the government (Directorate of Junior High School Development, 2007 (b)). Additionally, the researcher has not found yet an English proficiency test that can reflect the Biology teachers' English performance other than TOEIC. So far, the use of TOEIC as the English competence measurement of the Biology teachers is tolerable and considered legitimate by Directorate of Junior High School although TOEIC is not an appropriate test measurement for assessing the Biology teachers' English proficiency because it is intended specially for English communication in business (TOEIC (b):2010) or for testing speaking skills that are needed for reading a text, describing a picture, and answering to recorded questions (TOEIC (a): 2010). Soon after the researcher got the targeted subjects, she continued to collect the data related to the use of English as a medium of instruction at *SMP RSBI* where the right subjects were found by conducting the observation of teaching practices.

2.1.2 Stages of Conducting the Study

The main study was the observations of teaching practices. The observations were preceded with the preliminary study. The preliminary study was to equip the background knowledge of the research context. Before starting the teaching observation stage, the researcher determined the targeted subjects (See Table 2.1 for the research stages).

Table 2.1 Stages of Conducting the Study

Research Stage	The Approach	The Objective	Data collection Method and Instruments	Data Analysis
The preliminary study	The qualitative approach	To understand the general context of research	Reviewing the previous studies, free-guided interview and documentation study	Descriptive: explaining general context of research
The subject selection	The quantitative approach	To select the right subjects for the teaching practices observations	Questionnaire survey Documentation study Interview	Descriptive statistic: frequencies, percentage, mean. Taxonomy analysis: 1). the degree of the Biology teachers' response 2).ranking of the Biology teachers' English proficiency
Teaching practices observation	The qualitative approach	To explain the use of English by the Biology teachers as a medium of instruction to teach science-biology to the year 7 students of *SMP RSBI*?	Observation method. Instruments: videotaping, handy-cam Free-guided interview.	Descriptive analysis. Data transcribed and coded by eliciting the unimportant data and reducing them into the needed ones. Units of analysis: (1)The language feature of English (the vocabulary and the sentence patterns) used by the Biology teachers in the certain contexts of instructions, (2) the language function of English used by the Biology teachers in the certain contexts of instructions.

2.1.2.1 Preliminary Study

The preliminary study was needed in this research because the findings provide the background knowledge of the research context concerning with the real implementation of the policy on the use of English as a medium of instruction to teach Science-Biology to the year 7 students of *SMP RSBI* in Cluster IV in the past, now, and in the future. The researcher visited some SMP *RSBI's* in Cluster IV located in Madiun, Ngawi, Nganjuk, Kediri, Blitar, Pare, Ponorogo, Pacitan, Tulungagung, and Trenggalek. She did the interviews with the principles of *SMP RSBI*, the other Biology teachers, and the coordinators of *SMP RSBI* as the informants to obtain and secure the information needed. The instrument used to collect the data was the interview guide (see Appendices 1, 2, 3). The school principals, the coordinators of the *SMP RSBI* and the Biology teachers were asked about the Biology teacher's TOEFL/TOEIC score, the opinions and the attitudes toward the implementation of the government policy on the use of English as a medium of instruction to teach Science-Biology, the constraints, the struggles to solve the instructional language problems, their participation in seminars, workshops, trainings program to support their pedagogical development, and the students' level of English language competence.

The informants of the preliminary were chosen for the following reasons. (1) the school principles were selected because they were the superiors who supervised the teachers' activities and performance at school, (2) the other Biology teachers were selected because they were the teacher's colleagues who usually got in touch professionally and academically at school, (3) the coordinator

of *SMP RSBI* were selected because they were the ones who must be responsible for and got involved in the implementation of the program (See Table 2.2).

Table 2.2 Data Collection Methods of the Preliminary Study

No.	Methods of Data Collection	Instruments	Sources of Data
1.	Documentations	Documents	· Score of the biology teacher's English proficiency. · certificates (teacher's trainings, seminars, and workshop)
3.	Interviews	Interview Guide	· The principals of *SMP RSBI* · The other Biology teachers. · The coordinators of *SMP RSBI*

2.1.2.2 Subject Selection Stages

The selection of subjects of teaching observations uses to two criteria: having a good attitude toward the use of English as a medium of instruction to teach Science-Biology and being competent in using English to teach the given subject. To know the Biology teachers' attitudes, the researcher gave them a questionnaire. The questionnaire score indicated a level of the Biology teachers' attitudes toward the use of English as a medium of instruction to teach Science-Biology. Thirty two (32) Biology teachers of the 7^{th} grade *SMP RSBI* Cluster IV received the questionnaire. They were purposely chosen as the respondents to help the researcher select the Biology teachers of any sites of research (*SMP RSBI* in Cluster IV) to become the subjects of this research. The research subjects who were considered to have very positive attitudes toward the policy on the use of English as medium of instruction were those who have score in the range of

response category of 157-195. See Appendix 9 for the respondents' score of questionnaire items.

Meanwhile, one indicator used to know the Biology teachers' English competence is the score of TOEIC. The ranking of the TOEIC score was used to determine the subjects of the research. The researcher listed and then ranked the Biology teachers' TOEIC scores from the range of 220-420. Based on the ranking of TOEIC score, three Biology teachers were selected. The three Biology teachers were selected because the questionnaire and TOEIC scores were bigger than the other Biology teachers (See Table 2.4 for the participating subjects of research). The selected subjects were observed while they were practicing the teachings.

2.1.2.3 Observations of Teaching Practices

The observations were intended to explore *the language features of Englis*h and *the e language functions* that seem to be effective for the instructional purposes across *the instructional contexts* used by the selected subjects (three Biology teachers). These two language components were explored within the teaching stages which consist of *the opening, whilst teaching, and closing*.

As noted earlier in chapter I, language serves various kinds of function in the domain of social and academic function (Halliday, 1973; Van Ek's, 1980; Finocchiaro, 1983; Cummin 1999). Language is used to build relationships, to get needs, to communicate information, to investigate and acquire knowledge and other. In this research, the classification of academic language function that is proposed by Bailey, L Alison and Frances A. Butter & Christine Ong (2004) is used as a model. The language function is classified ***language function*** refers to

e*xplanation* (to make clear or easy to understand by giving information, to give reason for), ***description*** (to say or write what something is like, to provide a verbal picture), ***comparison*** (to examine or look for differences and/or similarities between two or more things), ***assessmen****t*, which for the purposes of this study is defined as the informal evaluation of the students' comprehension and knowledge during the course of a lesson, **c*larification*** (to make clear or easier to understand by giving more details or a simpler explanation), ***paraphrasing*** (to repeat something written or spoken using different words, often in a simpler and shorter form that makes the original meaning clearer).

Dealing with the instructional context, Bailey, L Alison and Frances A. Butter & Christine Ong (2004) wrote ***instructional context*** refers to ***applying instruction to assist students in classroom activities*** (asking the students to do things, directing the instruction and so on), ***science instruction*** (teaching the theories, the concepts, and the facts), and ***vocabulary instruction*** (introducing explicitly or implicitly vocabulary).

The observations were overtly done and conducted 5 to 6 times as samples. The observations were conducted from February, 2011 to June, 2011. Overt observations were preceded by two covert observations in order that the researcher captured the natural things in the Science classes. Besides, the covert observations were intended to reduce the Biology teachers' psychological burden, to make them comfortable and relaxed to teach. The covert observations were also used as an introduction to build a good personal relationship between the researcher and the Biology teachers and the students after she got permission from

the Biology teachers and the students. By this way, the overt classroom observations came up with the natural data. The Biology teachers could perform teaching activities without being disturbed by the researcher's presence.

Prior to observations, the Biology teachers were notified that the focus of the study was centered on the use of vocabulary, grammatical patterns, and language functions which seem to be effective in certain instructions. The effectiveness of three mentioned language aspects used by the Biology teachers appears in the smoothness of two-way interaction in negotiating meanings between the students and the Biology teachers. The responses given by the students and the interactions between the students and the Biology teachers in a whole teaching and learning process were the indicators that the Biology teacher's communicative intents were achieved.

In the early visit, the researcher observed the Biology teachers' and the students' language. However, the emphasis of the research is the Biology teachers' language. The researcher emphasized on the teacher talk capturing as much of the utterances as possible. After the class, the Biology teachers were asked if the academic vocabulary used during the lesson had been introduced to the students previously. The Biology teachers were also asked about the problems they faced and how they solved the instructional problems. Meanwhile, the student talk when the students were working individually, in peer or in group was less captured. The student talk was not the focus of the research and in fact, it was not easy to hear everything students said to one another. In addition, to comprehend a complete picture of English used within science classes, the

researcher reviewed the textbooks, the worksheets or hand-on activities, and the lesson plan written by the Biology teachers.

The selected subjects' oral English were observed while they were practicing the various instructions. The researcher came to each research site (*SMP RSBI* in Cluster IV) at different time to conduct the teaching observations. The classroom practices observations were followed by an in-depth interview before and after the teaching observation to enrich the data obtained. Each observation lasted for 2x40 minutes for every meeting. The researcher's presence in the classroom was accompanied by a Biology teacher and an English teacher. They helped the researcher to get the clarity and the explanations about the data being collected. During the observations the researcher immersed with the community in the classroom. She used supporting instruments, still picture camera, video camera, and field notes to capture the oral English performance of the Biology teachers. She recorded the observations directly, completed the checklist supplemented by the field notes or transferred the information from the field notes to the checklists soon after the classroom observations were finished. The qualitative data obtained during the observations were recorded in observation checklists and the field-notes, and then transcribed.

2. 2 Role of the Researcher

Since the approach of research is qualitative, the researcher is the main research instrument. Her presence in the field is a key instrument. This implies that the researcher's presence has a role as a data collector and data analyses. As a data collector, she was present or immersed during the study in the site of research

to see, observe and interact with the teachers and the students to have a good understanding of the use of English as a medium of instruction in Biology classes of *SMP RSBI*. The data were obtained from interconnected phases of fieldwork such as the interviews with the headmasters, the Biology teachers, the coordinators of *SMP RSBI*, observational field notes, videotaping. As a data analyst, she analyzed the data along the study was being carried out. As the study was going on, she developed observation guide used in the classroom and questions for in-depth interview.

2.3 Setting of the Study

The setting for this research involved *SMP RSBIs* in western area of East Java Province which commonly labeled as area of Cluster IV. The research was conducted at *SMP RSBIs* where the Biology teachers who had set up criteria found there. When the research was conducted in 2010/2011, there were twenty (17) *SMP RSBI*s and thirty (32) Biology teachers in Cluster IV. Three Biology teachers of different *SMP RSBI* (*SMPN I RSBI* Blitar, *SMPN I RSBI* Tulungagung, and *SMPN I RSBI* Trenggalek) met the criteria to become the subjects of the research.

Like *SMP RSBI* of different Clusters (Cluster 1, Middle Cluster, and others), the *SMP RSBIs* in cluster IV have already implemented the prescribed standard operation for *RSBI*. Each *RSBI* has been verified by the General Directorate of Primary and Secondary Education Management and has been implementing the standard operation procedure (SOP) and rules of game to run the school model of *SMP RSBI* requested by the government since the beginning of the program. The teachers of science have a regular meeting once every two

months to share their teaching experiences. They have a good network to make lesson plans, teaching materials, and design teaching strategies to improve their quality of teaching. They get teaching techniques and language trainings from lecturers of State University of Malang. Each coordinator of *SMP RSBI* meets once every month to evaluate and arrange the programs to improve the quality of teaching and learning process, to increase the students' academic achievement. Each *SMP RSBI* in cluster IV is a member of "Science Camp" and "National Olimpiad Science" and each school gets nomination as a winner. Teachers of science-biology get the teaching technique trainings by General Directorate of Primary and Secondary Education Management in the first and second batch. They collaborate with English teacher's counterparts as a reference when they get the difficulties in understanding English grammar and words. The students' English is improved by providing matriculation program, extra- hours for English. An interview with the Biology teachers in the preliminary study found the evidence that the use of English as medium of instruction does not lower the students' score of science-biology because the Biology teachers were still allowed to use Indonesian language. The average of students' biology score is above the Competence Standard of Graduate (SKL). Each member of cluster IV has of Understanding (MOU) with school sister "Semesta" in Semarang and in Singapore. They have the science teacher and the student exchange programs. The similar research is not yet conducted in this cluster. (See Table 2.3 for participating schools).

Table 2.3 The Participating Schools

No	***SMP RSBI***	**The School Principal (SP) and Coordinator (CP) (Given Code)**	**Number of Biology Teacher of *SMP RSBI* Years**-7	**The teacher (Given code)**	**TOEIC Score**
1.	*SMPN I RSBI* Madiun	SPI,CP1	2	T1,T2	345,320
	SMPN 2 RSBI Madiun	SP2,CP2	2	T3.T4	300,255
2.	*SMPN I RSBI* Ngawi	SP3,CP3	2	T5,T6	325,295
	SMPN 2 RSBI Ngawi	SP4,CP4	2	T7,T8	300, 220

No	***SMP RSBI***	**The School Principal (SP) and Coordinator (CP) (Given Code)**	**Number of Biology Teacher of *SMP RSBI* Years**-7	**The teacher (Given code)**	**TOEIC Score**
3.	*SMPN 1 RSBI* Nganjuk	SP5,CP5	2	T9,T10	345,300
	SMPN 1 RSBI Kertosono	SP6,CP6	2	T11.T12	290,275
4.	*SMPN 1 RSBI* Kediri	SP7,CP7	2	T13,T14	335, 345
	SMPN 4 RSBI Kediri	SP8,CP8	2	T15,T16	340, 370
5	*SMPN 2 RSBI* Pare	SP9,CP9	2	T17,T18	315, 340
6.	*SMPN I RSBI* Tulungagung	SP10,CP10	2	T19,**T20**	345, **415**
	SMPN 3 RSBI Tulungagung	SP11,CP11	2	T21,T22	340, 315
7.	*SMPN I RSBI* Trenggalek	SP12,CP12	1	**T23**	**420**
8.	*SMPN I RSBI* Blitar	SP13,CP13	2	T24,**T25**	355,**406**
	SMPN 2 RSBI Blitar	SP14,CP14	2	T26,T27	325,350
9.	*SMPN I RSBI* Pacetan	SP15,CP15	1	T28	270
10.	*SMPN I RSBI* Ponorago	SP16,CP16	2	T29,T30	230,245
	SMPN RSBI Jetis	SP17,CP17	2	T31,T32	280,220
	Total Number of *SMPN RSBI*: 17	Total Number of Biology Teacher: 32			

(Source: The General Directorate of Primary and Secondary Education Management. Decree: 543/C3/KEP/2007 and the interview with the Principle of *SMP RSBI*(s), 14 December 2010).

2.4 Sources of Data

In this study the data were taken from the many sources. The researcher took the data from information provided by the informants and the documents, the informants, the objects, the documents and the events. All Biology teachers of *SMP RSBI* (grade level year 7) in Cluster IV who were purposely selected as the

respondents (See Table 2.3) , the school principals, the Biology teachers' colleagues, and teaching learning activities in the classroom, the related documents were all used as the data sources to answer the proposed research question.

2.4.1 Informants of the Preliminary Study

The preliminary study involved six (6) School Principals ((SP2, SP4, SP7, SP8, SP10, SP12), six (6) Coordinators of *SMP RSBI* (CP2, CP4, SP7, CP8, CP10, CP12) and eleven (14) Biology teachers of any zones in Cluster IV as the informants (T2, T4, T8, T13, T20, T24). The informants were asked about the teachers' competence in using English as a medium of instruction to teach Science-Biology, the opinion on the implementation, the teacher's motivation to use English to teach subject, the constraints, the efforts to improve the teacher's and the student's English proficiency, and the experiences when they used English to teach Science-Biology.

2.4.2 Subjects of the Research

Three subjects of this research were selected by using the questionnaire survey and TOEIC score document review. The questionnaire score was used to measure the biology teacher's attitude toward the use of English as an instructional language while TOEIC score document was used to judge the Biology teacher's English competence. The bigger score the Biology teacher obtained the more positive attitude and the better language competence she/he had. The total respondents were 32 Biology teachers. But only 28 of 32

respondents returned the questionnaire. Of the twenty eight (28) biology teachers of *SMP RSBI* in Cluster IV, three Biology teachers of different *SMP RSBI* found possible to be selected as the subjects of the research. Although their TOEIC scores were really lower than the prescribed English proficiency level of the Biology teachers of *RSBI* but the level of English proficiency was higher than their colleagues. For ethical reasons, they were not given a name. They were merely given a code. Three coded teachers were (T20, T23, and T25). The score of questionnaire and the English competence of selected subjects are listed below. See Table 2.4

Table 2.4 The Subjects of the Research

Three Biology Teachers	English Proficiency Score	Questionnaire Score	Junior High School of *RSBI*
T25	406	174	*SMPN I RSBI* Blitar
T23	420	173	*SMPN I RSBI* Trenggalek
T20	415	171	*SMPN I RSBI* Tulungagung

(Source: *ETS* TOEIC SCORE ROSTER BY GROUP CODE, 27 November 2007 and Questionnaire Analysis).

2.5 Method of Data Collection

As stated formerly the key instrument in this qualitative study is the researcher herself (See 2.3). The data collection method was in-depth interview, questionnaire survey, documentation, and observation. These four data collection methods needed different instruments. The interview used an interview guide, a handy-cam, a tape recorder to record the in- depth interviews with the informants and the subjects. The survey used the questionnaire. The documentation method used the administrative documents. The observations used the observation checklist/explanation, and the field-notes. The field notes were used to convey alternative information in the form of description of activities and events which

happened in the science class. The field notes were made at every classroom practice observation. In conducting the teaching practice observation, the researcher also needed the supporting instruments to record the teaching learning activities such as a video, a handy-cam and the field-notes. These instruments were used to record the teacher's English performance.

2.5.1 Interviews

The interview was employed both in the preliminary study and the main research stages. In the preliminary study, the interviews protocol was done with the school principals, the Biology teachers, and the coordinator of *SMP RSBI* who were responsible for *SMP RSBI*. The interviews were carried out to get the information about the general perception of the use of English as a medium of instruction to teach science-biology. The interview used *Indonesian language* to avoid a misunderstanding and a breakdown of communication. The researcher asked the informants about the constraints, the efforts to improve the English proficiency, and the experiences when the Biology teachers used English to teach. See Appendices 1, 2, and 3 for interview guides.

Meanwhile, in the main research, the interview was done only with the Biology teachers who were definitely elected as the subjects of research. The interview was done before and after the classroom observations. The researcher asked the information about the teachers' ability to use English, the efforts made to enhance the English, the teachers' constraints in the classroom, and their teaching strategies to assist the students understand the content and language (See Appendix 4). See Figure 2.2 for the interview development items.

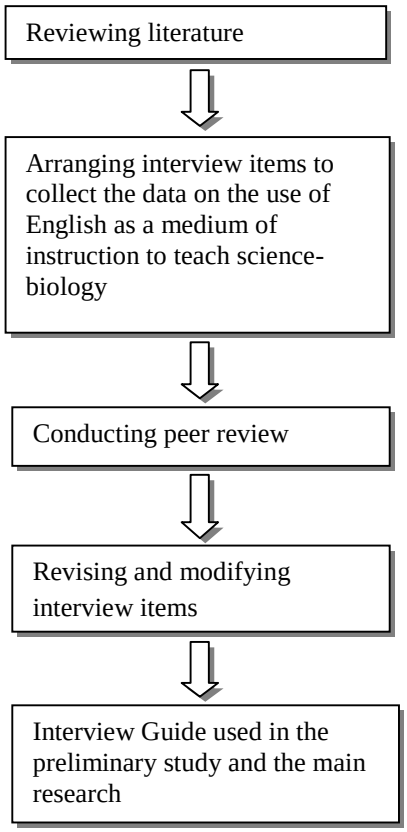

Figure 2.2 The Development of Interview Items

2.5.2 Questionnaire

The questionnaire was used as an instrument to elicit the information with the respect to facts toward the implementation of the teaching Biology in English more particularly the Biology teachers' opinion, attitudes, motivation, belief on the significance of English as a medium of instruction, their English competence, and teaching experiences to use English in science-biology class. For the clarity of the explanation, the questionnaire used *Indonesian language*. The questionnaire was constructed and designed by the researcher herself. To develop the questionnaire items, the researcher reviewed the related theories, the facts found in the preliminary study and the research objective. The questionnaire draft was

reviewed by the researcher's advisors and three Biology teachers before it was piloted. In response to the feedbacks, some of the earlier items were dropped and revisions were made for several items. The questionnaire items validation used the formula of (r) Pearson Correlation while the questionnaire reliability used Alpha Cronbach. The questionnaire was pilot tested to Biology teachers who teach the students of grade 7^{th}, 8^{th} and $9^{th.}$ Soon after the questionnaire was valid and reliable the questionnaire was administered to 32 Biology teachers who teach Science-Biology to the students of year 7 of *SMP RSBI* in cluster IV.

In line with the aim of questionnaire distribution, Likert Scale (1967) was used as an instrument to measure the respondent's responses. Five criteria of response were used: 1 represents strongly disagree, 2 represents disagree 3 represent somewhat disagree, 4 represents agree, and 5 represents strongly agree. The responses which were given by respondents were collected and later analyzed using SPSS (Statistical Package for Social Science for MS window Release 13) software. The score obtained by each respondent indicated the level of attitude toward the use of English as a medium of instruction. The bigger score the respondent attained, a better attitude she/he had. This means that the respondent believed the significance of the use of English as an instructional language. In reverse, the fewer score the respondent obtained a worse attitude she/he had. The questionnaire items explored the following hitches: the teachers' belief on the significance of the use of English to teach Biology (1, 3, 4, 5, 18, 19, and 21), the teachers' motivation (2, 7,14, 22, 24, 25, and 26), the teachers' belief on English competence (8, 9, 10, 11,15, and 16), the teachers' belief on the students'

language competence (13, 17 and 20), the teachers' preparedness to teach science in English (12, 16), the teachers' problems (31, 32, 33, 34, 35, 36, 37, and 38) and the teachers' steps to help students understand the content of knowledge being delivered (6, 12, 27, 28, 29, 30, and 39). The score achievement of respondent was ranked to select subjects of research. See Figure 2.3 for the procedure of developing the questionnaire items. (See Appendix 12 for the result of the questionnaire analyses).

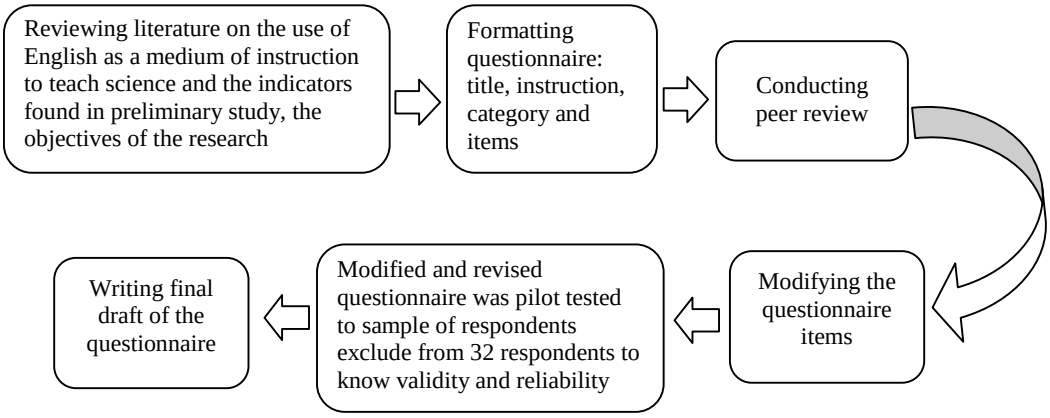

Figure 2.3 The Development of Questionnaire

2.5.3 Observations

The Science-Biology classes of three Biology teachers (T20, T23, and T25) were observed. The observations were initiated with a covert observation. This step was taken to reduce the psychological burden of the community in the classroom (the Biology teachers and the students) and to build a natural interpersonal relationship. The covert observations were done soon after the teachers and the students felt comfortable with the researcher's presence in the classroom. The observant was equipped with the observation checklists, the observation descriptive lists and field notes to collect the data needed to answer the research questions. She also used handy cam to record the teaching practices.

The observations were conducted 5 to 6 times as a sample of observations from February, 2011 to June, 2011. See Appendices 7, 8, and 9 for the observation guides. The details of the teaching observation activities were already elaborated (See 2.1.2.3)

2.5.4 Documentation Review

The researcher reviewed the teachers' important documents that report the English competency (TOEFL or TOEIC score), their participation in the local, regional, national, and international seminars, teaching media and teaching material development trainings, the short courses, and the other teacher professional development programs, list of students, grading book, and classroom administration. These files were collected and studied as the secondary data.

2.6 Data Analysis

The qualitative record was made right away after doing the interviews, the observations and reviewing all related documents. All necessary data from the observations and the interviews were recorded and the Biology teachers' document files were studied. The data collected from the interviews, the observations and documentations were descriptively analyzed with inductive approach. The researcher transcribed and coded the data by eliciting the important data and reducing them into the most important ones.

The data analysis used model of Spradley, James P. (1980) beginning the review of the data obtained from the observations, the interviews and the documentations. The data were categorized based on the domain, taxonomy and component analysis. The taxonomy refers to the ranking of English proficiency

level of the Biology teachers. The domain refers to the contexts of instructions. The component analysis includes the aspects of vocabulary, grammar, and language function of English used by three Biology teachers (T20, T23, and T25). in certain context of instructions. The cultural theme refers to the habit of using English as a medium of instruction to teach Science-Biology. The data analysis moved in a cycle process, repeated again and again to identify the differences and similarities of the vocabulary, grammar, language function of English used by three Biology teachers (T20, T23, and T25) in certain contexts of the instructions. The cycle of the data analysis is illustrated as T20 <-> T23 <-> T25 and stopped when no more new data needed appear.

Most of recordings and transcriptions consisted of the conversations between the Biology teachers and the students that were investigated for about 6 months (February 11, 2011- June 20, 2011). For this reason, the researcher needed analytical framework that allowed her to develop description of what vocabulary, grammar, and language functions each Biology teacher used in Science classes. The researcher logged a tape recorder and field-notes to create summaries of classroom activities and transcribed the Biology teachers' English. The data transcription of teaching practices observations are narrowed only to the language feature of English used by the three Biology teachers across the three contexts of instruction during 2x40 minutes every meeting. Once transcribed, the conversations were coded (#1, #2…) into the unit analysis of features of the vocabulary, grammar, and language function of English. The structural approach of language proposed by Rosenthal (1996), Henderson and Wellington (1998)

Jarret (1999), Cheong (1986) and a functional approach of language modeled by Austin (1962), Van Ek's (1980**)** , Halliday (1997) and Bailey, L Alison and Frances A. Butter & Christine Ong (2004) were used as theoretical framework of data analysis.

The result of the data analysis was discussed with the literature reviewed and the competent colleagues to get the validity of data obtained from the teaching practices observations and the interviews with the Biology teachers. The final result of the research was descriptions of the use of effective English as a medium of instruction by the Biology teachers of Junior High International Standard Schools, namely the use of vocabulary, grammar, and language functions of English. The findings shared might be similar or different from the existing thesis. See Chapter III for the detailed descriptions of language features and language function of English. (See Figure 2.4 for the qualitative Data Analysis)

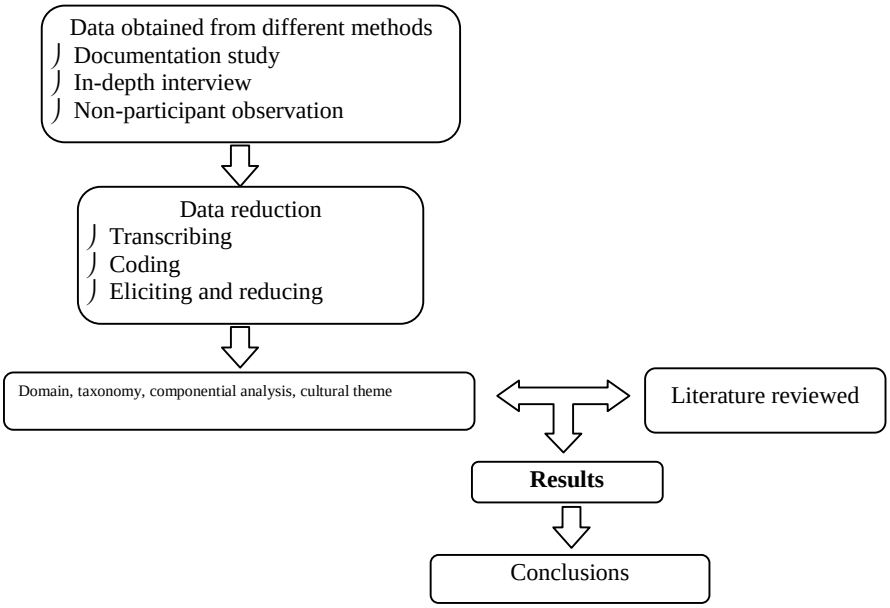

Figure 2.4 Qualitative Data Analysis

2.7 The Trust-worthiness of Data

Miles and Huberman (1984) defined the triangulation is the use of two or more methods of the data collection in the study of some aspects of human behavior. Bogdan and Bikklen (1998:104) confirmed that triangulation is borrowed from the social science to convey the idea that to establish a fact the researcher needs more than one source of information. In qualitative research, to get the trustworthiness of data, the triangulation should be done. It was a prescribed method to eliminate the researcher's opinion, prejudice, and bias toward the data that were obtained from many methods. In this research, the trustworthiness of data was done by a cross check data obtained from observations with the data gained from the interviews with the school principals, the Biology teachers and their colleagues and the documentations or on the way around.

The researcher questioned the Biology teachers about: (1) what language aspects were demanded in order that the teachers conduct the effective instructions, (2) what kinds of vocabulary and grammar did they have to master, (3) which vocabulary and grammar were effective for certain instructions (4) How did they use English to make the students understand what they meant, (5)what teaching strategies were employed to solve their instructional problems, (6) how did they improve their English proficiency. The answers, then, were cross-checked or triangulated with the answers of the principals, their colleagues and the available documents.

2.8 Assumptions

Several theoretical assumptions guided this research. A literature notes that the teaching stages are embedded in language. In the area of teaching, the language is very vital for tutoring, instructing, drilling, asking question, testing, providing information and helping the students understand knowledge imparted by the teachers (Allwright and Bailey) in Rod Ellis (1994). This thesis implies that the students' understanding of subject content is heavily influenced by the clarity of the language of the teachers. The students will understand what the teachers talk if the language is assessable and understandable.

A language is composed of unit of words that are arranged to make a larger unit of phrase, sentence, discourse where meaning and grammar come together. Words and grammatical patterns of language play a very important role in a language because they appear in every language (Fromkin, Victoria, David Blair & Peter Collin, 200: 150). Mastering vocabulary and grammatical rules of language allows us to communicate with one another. Communicating ideas and opinions in a language to other people does not only need to master the vocabulary (collection of words), grammatical rules of a language and socio-cultural aspects dealing with "when to speak, what is talked, with whom, where, in what manner" but also need to understand the functions of language (Widdowson, 1983 and Brown, 1987).

In the case of teaching science using a second or foreign language, the teachers are prescribed to possess two kinds of language competences. They have to have the competences to use a language for the social and academic functions

(Cummin, 1992). In the context of my research, the Biology teachers who have these two language competences are assumed to be rich of vocabulary, knowledge of grammar and have ability to use English socially and academically appropriate to the instructional goals.

The teachers who have such social and academic language competences may be called the effective teachers. Further, it is assumed that the effective teachers are able to make an effective language for the instructions. The effective instructional language is a language of instruction that really demanded by certain context of instructions to achieve its intents. The students will understand the subject contents if the instructions are delivered in the effective language. The effective language is usually marked by its clarity. The Biology teachers who are competent in language are not impeded with the restriction of vocabulary, a bad understanding of grammatical rules, and lack knowledge of language function. They are supposed to be easy to communicate with their students to do the various instructions. They may not face a linguistic problem when they conduct the instructions. They can express their thoughts, desires, feelings, and so forth. In these regards, the classroom interactions and the instructions may run well.

CHAPTER III

FINDINGS

This chapter III presents the findings of the observations of teaching practices in the Science-Biology classes. The findings expose the features of English used as a medium of instruction by the three Biology teachers of *SMP RSBI* Cluster IV. The features of English were characterized by the variety of vocabulary, grammar and language functions which appear within the three contexts of instructions: application of instruction, the science instruction and the vocabulary instruction.

3.1 The Language Features of English Used by the Biology Teachers

The 7th grade Science-Biology classes of three different *SMP RSBI(s)* were observed. Two topics on ***the mutual dependence between ecosystems science*** and ***the diversity of organism in ecosystem and human efforts to preserve varieties of organisms*** were offered to the students by T20, T23 and T25. All of the 7th grade observations involved a whole class instruction. The classroom activities were arranged as peer-peer collaboration, an individual works and experiments. The individual works were most often followed up by regrouping the students or pairing them to build on what the students had done in the class and in Science laboratory. The sections 3.1.1, 3.1.2, and 3.1.3 report a sample set of the words, grammars and language functions of English used by the three Biology teachers.

3.1.1 Vocabulary

Three categories of words were identified, namely: (1) High Frequency General words (words that are used regularly in everyday context), (2) Non-Specialized Academic Words (words that are used across content area) and (3) Specialized Content Area Words (academic words unique to specific content area/conceptual terminology of science). The three categories of words appeared in the Biology teachers' talk (utterances and discourses) within the application of instruction, the science instruction and the vocabulary instruction. The three word categories are classified as verbs, nouns, adjectives, adverbs, pronouns, preposition, conjunctions, and interjection. Sections 3.1.1.1, 3.1.1.2 and 3.1.1.3 display the identified vocabulary.

3.1.1.1 High Frequency General Words

High Frequency General Words mean the words which are commonly used in a daily conversation context (Wellington, 2000). The subclasses of High Frequency Words are classified into content words such as verb, noun, adjective, adverb, pronoun, conjunction, preposition and interjection. See Extract 3.1, Extract 3.2, Extract 3.3, Extract 3.4, Extract 3.5, Extract 3.6 and Extract 3.7 for a sample set of High Frequency Words used by T20, T23 and T25.

Extract 3.1 A sample set of verbs

continue, discuss, stand, come forward, sit down, read, write, take, open, close, make, divide, walk, see, divide, increase, know, remember, compose, elaborate, look, determine, mention, occur, repeat, find, show, keep, help, speak, listen, get, cut, continue, decrease, advantage, disadvantage, live, can, do, draw, compare, continue, think, answer, question, need, choose, find, consist of, depend on, use, look at, change, completed, record, measure, ,grow, write down, contain, prevent, support, study, follow, marked, get, protect, describe, damage, support, think, stop, finished, let, check, belong to, consists of, count, stand up, destroy, put, threaten, happen, fill, feed, learn, conduct, try, surrounded, jump,

added, contain, will, can, must, call, produce, consume, covered, gives, analyze, estimate, cause, protect, preserve, interact, walk, may, contain, sells, digest, cause, affect.

Extract 3.2 A sample set of nouns

Whiteboard, ice, leaf, frog, tree, bottle, schoolyard, flies, ant, deer, buffalos, book, hand on activities, people, friend, bottle, group, grasshopper, destruction, forest, river, fish, similarities, friend, pattern, advantage, disadvantage, answer, question, disease, ticket, fond, blood, example, interaction, wood, vitamin, sunlight, roads, place, organism, river, insect, bushes, grass, stone, rats, birds, soil, air, light, dangers, water, scissor, a ruler, board makers, eraser, picture, book, pen, sand, flood, temperature, mountain, materials, thermometers, respiration, glasses, relationship, desert, energy, nutrition, human beings, living things, non living things, bacteria, virus, land, producers, owls, classroom, room, population, ecosystem, months, color, schools, environment, role, place, size, area, organism, plants, chain, animals, consumers, components, factors, community, habit, investigation, activity, process, respiration, rate, gill, experiments, weight, chapter.

Extract 3.3 A sample set of adjectives

quite, silent, cold, careful, small, diligent, big, small, large, fertile, high, tall, round, hot, fresh, rotten, extinct, particular, dense, moderate, clear, loud, slow, artificial, deep, quick, different, same, natural, unnecessary, necessary, ripe, difficult, easy, true, false, wrong, renewable, typical, negative, positive, sustainable, careful, careless, near, advantageous, light, rare, popular, important, unimportant, successful, good, bad, right, legal, high, uncountable, tropical, whole, accurate.

Extract 3.4 A sample set of adverbs

Carefully, loudly, quickly, slowly, well, generally, everyday, next week, last week, few minutes, long time, socially, economically, culturally, specially, naturally, approximately, usually, in the yard, in the pond, gradually, now, tomorrow, in the library, in the classroom, accurately, easily, especially, later.

Extract 3.5 A sample set of pronouns

I, you, they, we, she, he, it, its

Extract 3.5 A sample set of conjunctions

Or, and, because, so, but, because, so, on the other hand, therefore, unlike, for instance, however, then, in sort.

Extract **3.6 A sample set of prepositions**

At, on, by, after, before, to, with, among, between, around, beside, above, about, over, for, in front of, back of, beside.

Extract 3.7 A sample set of interjections

Wow.., hi.., fine.., well..., All right…

3.1.1.2 Non-Specialized Academic Words

Non-Specialized Academic Words mean the words that are used across content area. The non-technical words are the terms that have one or several meanings in an everyday setting but have a specific and sometimes different meaning or connotation in a scientific context (Wellington, 2000). See Extract 3.8 for a sample set of Non-specialized Academic Words used by T20, T23 and T25.

Extract 3.8 A sample of non-specialized academic words

Examine, sample, cause, marine, human being, Sample organism, item, ecosystem, conservation, natural, controlled, fire, forest, context hunted, sustainable, exploitation, habitat, component, animal, estimate, community, niche, observe , interaction, individual, eat, get, population, sand, store, interrelated, consume, erosion, protect, survive, virus, the science bacteria, chemical, substance, function, kill, element, harmful, source, termites, produce, preserve, affect, density, food chain, provide, transfer, mineral, processes, human, organic, density, bacteria, biotic, boundary, solar, logging, legal, illegal, energy, air, abiotic, preservation, continue.temperature, sunlight, investigate, member, extinct, analyze, conduct, Biology, volume, respiration, insect, environment, thermometer, experiment, non-living things, living things, vitamin, soil, fertile, survive, hypothesis, permission, deforestry, powder, national park, tourism park, road, natural sanctuary, natural protection, forest preservation, formulate, assess, chain, nourishment, diagram, chart, model, cultivation, location, factories, chance, varieties, fungi, pesticides, insectides, overuse, respirate, natural, disaster, and other.

3.1.1.3 Specialized Content Area Words

Specialized Content area Words mean the academic words unique to specific content area/conceptual terminology of science (Wellington, 2000). Since exploration of conceptual terminology covered only two subtopics: "*the mutual dependence between ecosystems science" and "the diversity of organism in ecosystem and human efforts to preserve varieties of organisms"*, just small size samples of specialized content area words were captured .See Extract 3.9 for a sample set of Specialized Content Area Words used by T20, T23 and T25.

Extract 3.9 A sample se of specialized academic words

pollen, biodiversity, food chain, food web, photosynthesis, sepsis, parasitism, mutate, a, chromosome, species, host, commensalism, mutualism, predation, the balance of ecosystem, elodea, omnivore, herbivore, marine, biome, biosphere..

3.1.2 Grammar

The classroom observations did not only investigate the linguistic unit of part of speech such as the nouns, the verbs, the adjectives, the adverbs but also the use of grammar of English. The grammar was explored through the use of the sentence patterns and the tenses. The three following sections (3.1.2.1.1, 3.1.2.1.2, and 3.1.2.1. 1.3) present a sample set of model grammars that are used by the three Biology teachers.

3.1.2. 1 Sentence Pattern

Four sentence patterns were identified are (1) declaratives, (2) interrogatives and (3) imperatives (4) exclamatory.

3.1.2.1.1 Declaratives

See Extract 3.10 for a sample set of declaratives

Extract 3.10 A sample of declaratives

- Worm makes the soil fertile.
- Grasshopper eats leaves of mango.
- An ecosystem always consists of living and non- living things.
- Ecosystem consists of two communities: a biotic and biotic.
- Everyone has responsibility to preserve bio natural resource.
- We must do reservation because many plants and animals are destructed.
- The destruction is caused by factors come from nature and human.
- You will draw something.
- There are some activities we use to preserve biodiversity.
- Maintaining forest preservation and determining natural protection area are our jobs.
- A food web is like a spider's web.
- A food web is complex and interrelated food chains in ecosystem.
- Bears eat fish, honeybee.
- Owls eat various kinds of animals.

- Sometime some different organism eats the same kind of food.
- Grass, for example, is consumed by deer, horse, and buffalos.
- Today we are going to discuss organisms.
- A farmer plants trees in his garden to prevent erosion.
- The trees can protect the soil from flood.
- Sunlight, water, and temperature are important factors in a certain ecosystem.
- Sunlight, water, and temperature determine what kind of plant can grow on a certain ecosystem.
- The frogs were surrounded by insects
- You are true.
- You observe a certain place, you will see organism.
- Soil contains nutrition which is needed by the plants.
- Giraffes, zebras, deer, birds, and monkeys are called population.
- It was not population (negation)
- You were true.
- The monkey of your neighbor was called an individual.
- It was a member of population.
- Today we're going to observe the components of ecosystem in a bottle we made.
- Last two days, you filled the bottle with water up to 10cm high.
- Everyone gets one paper.
- We will make groups A, B, C, and D.
- There are some conclusions.
- Third, the destruction is caused by factors come from nature and human.
- Maintaining forest preservation and determining natural protection.

3.1.2.1.2 Interrogatives

See Extract 3.11 for a sample set of interrogatives

Extract 3.11 A sample of interrogatives

- Do you understand?
- Why does mango tree give benefit to grasshopper?
- Why is worm beneficial to soil?
- Can you give definition in English?
- Do you remember?
- What is the example of individual?
- Does mango belong to individual or population?
- Do you know the population around school area?
- Which one is individual and which is population?
- Are you ready to answer?
- What is earth?
- What are components of biotic and biotic?
- Which one is called the living things?
- Can you call water, sand abiotic components?
- Can you call ant, flies abiotic components?
- Are they biotic or abiotic components?
- How are you this morning?
- Is anyone absent in the class today?
- Can we start now?
- How are you today?

- Who is not present today?
- What are the common characteristics of the living things?
- Does mango belong to individual or population?
- Are students called community?
- Could you call monkey population?
- What is difference between population and individual?
- Why is diversity very important for organism preservation?
- Where do you usually see pollen?

3.1.2.1.3 Imperatives

See Extract 3.12 for a sample set of imperatives

Extract 3.12 A sample set of imperatives

- Please translate to Indonesian!
- Translate “food chain”!
- You must check dictionary or your note!
- Andi.., give your opinion!
- Mention one population!
- Come forward!
- Read my hand-on activities!
- Make classification of ecosystem!
- Watch question number four!
- Mention one population you know!
- You must observe the population living there
- Come forward!
- Read my hand-on activities!
- Make classification of ecosystem!
- Draw a cat, monkey or bird!
- Mention the organisms!
- Let’s stop now!
- Read it!
- Translate “ecosystem” into *Bahasa Indonesia*!
- Be quite, please!
- Raise your hand, please!
- Yuli... speak please!
- One by one!
- Faster is better!
- Attention in here!
- Number three, attention, please!
- Go to the question five!
- Speak loudly! Andi so we can hear you”.
- Get attention, please….!.” Attention in here!
- Classify things that you observed into two groups: living things and non-living things!
- Observe whether living things affect non-living things!
- Place some elodea, put the goldfish, and fed the fish!
- Mention two extinct animals at Java Island!
- Make an essay describing about the benefits of preserving rare plants and animals!

3.1.2.1.4 Exclamatory

See Extract 3.13 for a sample set of exclamatory

Extract 3.13 A sample set of exclamatory

- Wow…that is a good answer!
- What, come out!
- It is a wonderful day!
- It looks better!
- Enough!
- It is not fair
- That is too slow!
- I am really disappointed in you!
- Shut up!
- How come!
- You re serious!
- You are not kidding!

3.1.2.2 Tenses

It was identified that the three Biology teachers using the non-past tense (the simple present tense and the future tense) and the past tense. See Extract 3.13 for a sample of the tenses used by T20, T23 and T25.

Extract 3.13 A sample set of present tenses

- It is time for students to come forward.
- The biotic factors depend on the abiotic factors
- Does mango belong to individual or population?
- Do you remember the process of photosynthesis?
- Do living things affect non-living things?
- How do producers, consumers interact
- Can you give definition in English?
- It is enough? Isn't it?
- Bacteria and virus are parasites.
- You sometimes get shore throat.
- You live in your own environment.
- The habitat of wish is water
- What is density?
- Figure 1.2 shows components of simple food chain.
- Soil is an abiotic component.
- Green plants need solar energy to produce food.
- Soil can affect plants and other organisms in an ecosystem.
- What do you see*?*
- Food is very necessary for every organism.
- Plants catch the energy of sunlight.
- Worm makes the soil fertile
- Can you give definition in English?

- Hunters must have legal permission.
- How are organism categorized?
- How are you today?
- Do you remember the topic?

Extract 3.14 A sample set of future tenses

- You will examine the effect of temperature to a fish's respiration rate.
- The diversity of organism will be discussed next week.
- The illegal logging will damage the forest.
- The need of field will increase if the population grows.
- The forest destructions will disturb the organism.
- We will make a conclusion.
- We will meet next week
- You will draw one organism you observed.
- Each group will draw.
- We will make groups A, B, C, and D.
- You will draw something.

Extract 3.15 A sample set of past tenses

- The gill opened faster in low temperature than in high temperature.
- Did this experiment support your hypothesis?
- Did you discuss help you understand the topic?

3.2 The Language Functions of English Used by the Biology Teachers

Two categories of language function of English were identified within the contexts of application of instruction, science instruction and vocabulary instruction. The first category, English is used for the purpose of the social functions (BICS). The second category, English is used for the academic functions (CALP). Sections 3.2.1, 3.2.2 and 3.2.3 display the data of the language function of English used by the three Biology teachers. For ethical reasons the Biology teachers were not given names. They were indicated symbolically by *T20*, *T23*, and *T25*. The code of *T20* refers to the Biology teacher of *SMPN I RSBI,*Tulungagung, *T23* refers to the Biology teacher of *SMPNI RSBI, Trenggalek,* and *T25* refers to the Biology teacher of *SMPN I RSBI, Blitar.*

3.2.1 Application of Instruction

Examples # 1	***:***	***English for social functions (BICS): greeting and expressing wants.***
T20	:	Good morning. How are you today?
S	:	Fine, Mam..., and you?
T20	:	Very good, thank you.
T20	:	Who is not present today? I will call you
S	:	Juli. She is sick.
T20	:	Okay, let's start! Are you ready?
S	:	Yes!
T23	:	Hello, Good afternoon. Nice to meet you
T23	:	How are you doing?
S	:	Fine....
T23	:	Who is not in the class today?
S	:	Ali, Lia, and Tatik are absent today.
T23	:	Can we start? Are you happy to study this topic?
S	:	yes..., we like it.
T25	:	Hello, Good morning. I am glad to see you.
T25	:	How are you this morning?
S		We are fine, mom...!, thank you
T25	:	Is anyone absent in the class today?
S	:	No one is absent...
T25	:	Can we start?
T25	:	It is ok! Let begin the lesson!
Examples # 2	***:***	***English for social functions (BICS): greeting and expressing wants.***
T20	:	Hi....students! Good morning!
T20	:	Is everybody fine today?
S	:	Yes….great! How about you?
T20	:	Not too bad!
T20	:	Our topic today is about population.
	:	We continue our lesson last meeting.
Examples #3	***:***	***English for social functions (BICS): expressing needs, wants and leave-takings.***
T20	:	Time is over
	:	Let's stop now!
	:	Finish! We will make a conclusion.
	:	We will meet next week.
	:	The result of your test, I will give you next week.
	:	See you next week.
T23	:	It is time to finish our lesson.
	:	Let's make the conclusions.
	:	Okay.... see you next week!
	:	Have a nice day!
T25	:	Let's stop the lesson.
	:	We run out of the time
	:	Let's write the conclusions.
	:	It is enough? Isn't it?
	:	Okay....see you next week!
Examples #4	***:***	***English for academic function (CALP): explaining the students understand tasks.***
T23	:	Today we are going to discuss organisms. What kind of organisms you see in the school backyard?

You must observe the organisms that live in there!
Everyone gets one paper.
What you must do after you get this paper?
We will make groups A, B, C, and D.
You will draw one organism you observed.
Each group will draw.
You must draw and mention the organisms!

T20 : The topic today is ecosystem.
Classify the components of ecosystem"
Time is limited.
Your time is five minutes.
You will draw in three minutes only.
Please translate to Indonesian!
Translate "ecosystem"!
You must check dictionary!

T25 : What will you find if you see a river?
Classify organisms in a river ecosystem.
You'll be able to distinguish living and non- living things.
This is my question: what does a fish belong to? And what do sand belong to? Which one belongs to a living thing?
Raise your hand, please! (Many students rise hand). Number two (read the attendance list) Yuli... please! One by one! Faster is better!
Attention in here! Number three, attention, please! For group number three, what is your answer?

Example #5 : English for academic function (CALP): explaining the students to accomplish tasks.

T20 : I know a food web is like a spider's web.
Watch question number four! It says a food
web is complex and interrelated food chains in ecosystem.
(The class confirmed that bears eat fish, honeybee, owls eat various kinds of animals). Sometime some different organism eats the same kind of food. Grass, for example, is consumed by deer, horse, and buffalos).
Okay….go to the question five!

Example #6 : English for academic function (CALP): describing the students understand tasks.

T20 : A farmer plants trees in his garden to prevent erosion. The trees can protect the soil from flood. Sunlight, water, and temperature are important factors that determine what kind of plant can grow on a certain ecosystem. Soil contains nutrition which is needed by the plants.

Example #7 : English for academic function (CALP): describing the students how to accomplish tasks.

T23 : Today, we're going to observe the components of ecosystem in a bottle we made. Last two days, you filled the bottle with water up to 10cm high, placed some elodea, put the goldfish, and fed the fish. Now, can you see the components inside the bottle support each other to make up ecosystem? Are they interrelated each other?

Example #8 : English for academic function (CALP): assessing whether the students understand tasks.

T20 : Which one is called the non-living thing?

An ant, a fly, a grasshopper, a caterpillar, or stone?
Which one is called the living thing?
trees, flowers, grass, soil, stones, water, snake"

Example #9 : ***English for academic function (CALP): clarification to understand tasks.***

T25 : We would create a model of ecosystem in a river.
S : Are we studying the river?
T25 : We are not studying the river itself
T25 : We are just doing a model.

Example #10 : ***English for academic function (CALP): clarification to accomplish tasks.***

T23 : Draw a living organism like this. This animal lives in the forest. Animal [must be the] same species. Important [that it is] the same (the teacher continued to give instructions for the class demonstration of
S1 : drawing the animal.)
T23 : We do it?
S2 : Yes, that's why I am modeling you.
T23 : Animals [and] plants. Would be a flower?
T23 : That's impossible. (The teacher gave the students an example of tiger).
S3 : Is it true if it's a lion?
T23 : Yes, the animal must be the same species.

Example #11 : ***English for academic function (CALP): directing an instruction to understand tasks.***

T23 : What to do?
Choose a small area around the school.
Observe carefully everything in the area which you have marked and note down everything you found. Classify things that you observed into two groups! The living things and non-living things. Observe whether the living things affect non-living things! Do they happen in a reverse order?
T 25 : Fill the paper. You are able to write at least five causes of natural disaster.

Example #12 : ***English for academic function (CALP): directing behavior to accomplish tasks.***

T20 : Speak loudly! Andi so we can hear you". The Biology teacher continued to say "get attention, please….!." Attention in here! (To whole class).

Example #13 : ***English for academic function (CALP): directing behavior to accomplish tasks.***

T23 : Do you still remember the definition of ecosystem? Raise your hand, please! [Many students raise hand]. One by one! Reni..... Please! Okay. Stand up! Come forward! Write your answer on whiteboard! Quickly..!

T25 : Group A will draw omnivores, group B will draw plants, group C will draw herbivores, and the last will draw carnivores. How many

minutes you need? Time is limited. Your time is five minutes. You will draw in three minutes only.

3.2.2 Science Instruction

To facilitate the 7th grade the science instruction, the oral language functions of the explanation, the description, the comparison, the assessment, and the repair strategies of clarification and paraphrasing were used by the Biology teachers. A sample of oral language functions are presented as follow. In the examples #34 and 35, material in square brackets [ ] was added by the researcher to provide the contextual information and was not part of the actual teacher/student talk. The information in parenthesis ( ) in the examples # 17 and #22 describe physical actions or classroom activities.

Example #14	***:***	***English for academic function (CALP): explanation in science instruction.***
T20	:	Do bacteria which live in intestine have a mutualisms relationship with human beings? Human beings provide food and a place to live for the bacteria. That's a mutualism relationship.
	:	Everyone has responsibility to preserve bionatural resources. We must do reservation because many plants and animals are destructed. The destruction is caused by factors come from nature and human.
		There are some activities we use to preserve biodiversity. Maintaining forest preservation and determining natural protection area.
T23	:	Do lice have the interaction with dog's blood? What kind of interaction pattern do these two organisms have? Their interaction pattern is called parasitism because one organism gets some advantages and the other gets disadvantages as a host. Lice eat dog's blood.
Example #14	***:***	***English for academic function (CALP): language function of explanation in science instruction.***
T25	:	The sun is the main source of energy for all organisms on the earth. Green plants need this solar energy to produce food. Animals and human beings get energy by plants and other organism that also eat plants to get energy. In short, you also need solar energy because you eat plants that use the solar to produce food.
Example #15	***:***	***English for academic function (CALP): language function of explanation in science instruction.***
T23	:	What you did was you controlled the effect of oxygen on the respiration. You put the fish into the warm and the cold water. Scientists did this to prove that cold water contains more oxygen than the warm water. So, why do you think fish breathe faster in warm water than cold water?

Example #16	***:***	***English for academic function (CALP): description in science instruction.***
T20	:	The light comes. The plant has leaves like a dish, a satellite dish, to get light.
	:	There is a population in an ecosystem.
	:	Ecosystem consists of two communities: a biotic and biotic
	:	There is an interaction between biotic and a biotic ecosystem
Example #17	***:***	***English for academic function (CALP): comparison in science instruction.***
T20	:	Giraffes, zebras, deer, birds, and monkeys are called population in (Teacher said what about a "monkey" of your neighbor) could you call it population? Think of it! (Gestures, with hands coming together).
S	:	No, it was not population.
T20	:	You were true. The monkey of your neighbor was called an individual. It was a member of population.
Example #18	***:***	***English for academic function (CALP): assessment in science instruction.***
T25	:	Can you tell me what you already know about preserving plants?
	:	What will happen if the exploitation of plants is out of control?
S1	:	They become extinct
T25	:	What should we do to prevent it?
S2	:	Logging should be controlled; forest is prevented from fire, and reforestation is carried out.
Example #19	***:***	***English for academic function (CALP): assessment in science instruction.***
T20	:	Why are preservation efforts necessary? Nia… explain!
Example #20		***English for academic function (CALP): assessment in science instruction.***
T25	:	What did we learn in our last unit on protecting rare animals? What rules are to be obeyed?
	:	What is population?
	:	Do you remember?
Example #21	***:***	***English for academic function (CALP): clarification in science instruction.***
T25	:	We are studying a river
Ss	:	Are we studying a river?
T25	:	We're not studying the river. We're doing a model. Remember our other experiment? Did we go to the river?

3.2.3 Vocabulary Instruction

This section addresses the ways the three Biology teachers supported the students' understanding of English vocabulary that is used within the teaching

activities. The three Biology teachers used the language functions of the description, the explanation and the clarification to help the students comprehend the offering words. See examples # 22, #23, #24 and #25 for a sample of vocabulary instruction.

Example #22	***:***	***English for academic function (CALP): definition in explanation.***
T25	:	(Speaking to an individual student). Do you Know what it means to preserve? It means you protect it from changing or stopping.
Example #23	***:***	***English for academic function (CALP): definition in description.***
T23	:	What is population?
	:	Population refers to all people or animals of particular type at a certain location. For example, the students are population of classroom. There are twenty students in the classroom.
Example #24	***:***	***English for academic function (CALP): definition in clarification.***
T20	:	What is biosphere?
S	:	Water surface.
T20	:	Biosphere is not water surface. It is the earth' surface and atmosphere which is inhabited by the living things
Example #25	***:***	***English for academic function (CALP): paraphrasing in clarification.***
T23	:	Describe the interaction between an orchid and a tree?
Ss		We do not understand
T23	:	Have a look on me what can you say about the interaction between an orchid which was stuck on a tree? Do you think that the orchid can get sunlight easily when it lives in a small tree?
Example #26	***:***	***English for academic function (CALP): synonym in explanation.***
T25	*:*	***Sola****r* means **s*un*.** We need a **s*olar energy* (*sun*)**
Example #27	***:***	***English for academic function (CALP): synonym in explanation.***
T23	:	I go to Prigi Park in Trenggalek and observe… I see all this ***powde*r…*Pollen*.** I need **pollen** or ***special powder***
Example #28	***:***	***English for academic function (CALP): synonym in assessment.***
T25	:	What zebras need to survive?
S1	:	"food," "water,"
S2	:	***Space.***
T25	:	What is that called *space?* ***Shelter.***
Example #29	***:***	***English for academic function (CALP): synonym in directing instruction.***
T20	:	How do you think we can explain? Remember how I said you need to make ***a conclusion or judgment*?**

Example #30 : ***English for academic function (CALP): visual synonym.***

T25 : Discussing the behaviors of mosquito beat her hands, ***while telling the students this behavior; she placed a hand on her own hand region.***

Example #31 : ***English for academic function (CALP): providing a sample set of examples in an explanation.***

T25 : There are many animals which are nearly extinct, ***like the elephants, lion and tiger.***

Example #32 : ***English for academic function (CALP): providing a sample set of examples in description.***

T20 : There are *many animal*s which are nearly ***extinct, like the elephants, lion and tiger.***

Example #33 : ***English for academic function (CALP): example in explanation.***

T20 : "***Photosynthesis"***. All kinds of plants have different ways to get light. ***Photo means light***…***synthesis means put together***. Thus, ***photosynthesis*** means put ***together lights***.

Example #34 : ***English for academic function (CALP): example in description.***

T25 : Food cake is not very dense. Brownies are much denser [the word "dense"] is repeated many times. Dense means heavy or thick.

Example #35 : ***English for academic function (CALP): repetition.***

T25 : [You see a food cake]. That is not *dens*e (r*epeated 3 tim*es). How about brownies? *Much denser (repeated 3 times)*. Dense is very *thick* and *heav*y.

CHAPTER IV

DISCUSSION

This chapter discusses the findings of the research. The discussion does not explicitly discuss a unit by unit of research findings in the detailed examples to avoid the overexposed data findings. In this section, the research questions are revisited and the findings are summarized. The discussion emphasizes on the use of English by the three Biology teachers as a medium of instruction, more specifically on the components of the vocabulary, the grammar and the language function of English which appear in the teachers' talk within the teaching episodes.

4.1 The Language Features of English Used by the Biology Teachers

The three Biology teachers are found competent to use the three types of vocabulary, grammar and several language functions which are demanded by the three contexts of instructions. The three Biology teachers have ability to use the types of vocabulary, grammar and to make the Basic English sentence pattern with the formula Subject plus Predicate and its transformational patterns for the various social and academic functions that are appropriate to the certain contexts of instructions. The possession of such a working English proficiency advantages to both the Biology teachers themselves and the students. The instructional intents can be achieved and the students' academic achievement remains better (Appendix 11 Extract 2).

As the providers of a language input, the intensity of the use of the language components by the three Biology teachers enrich the students' knowledge of the words, the grammars and the language functions of English which is semantically, syntactically and culturally appropriate. The students are drilled to hear, listen, read and write the various types of words, grammars and language function from the teachers' talk. By these experiences, the students get more opportunities to practice using English (Appendix 11 Extracts 3 and 4). If the habit of using English is frequently and regularly done, the communication skills will develop. And by the time, the language learners can reach a certain working English proficiency level. The students will be proficient in English if the students get habit of using English as a means of communication (Cummin, 1992).

The observations of teaching practices discover the three Biology teachers can conduct the instructions and freely express their ideas, opinions, and desires to the students. The richness of knowledge of vocabulary, grammar and language function is supposed to be a modality for the Biology teachers produces the effective instructions for their communicative intents. The three Biology teachers' instructions seem to be effective because the English they use for their instructions is in the reach of the students' English proficiency level. The three Biology teachers use the general words, the specialized words and the non specialized words that are common and assessable to the students. See sections 3.1.1-3.1.3 for a sample of the words used by the three Biology teachers. Since the English used is comprehensible, the students do not feel difficult to understand

what the teachers talk. This is proved by a high participation and motivation of the students in the classroom activities. It is found the students get the joys and the easiness in learning science although it is delivered in English. There are not any students found sleepy. The majority students are interested in the given topic. They actively give the positive responses and answers when the teachers raise the questions to them (Appendix 11 Extract 9).

By performing understandable English, the Biology teachers' instructions are understood by the students. The data show the students can conduct the various classroom activities which are instructed by the teachers (Example #11). In addition, the frequent responses that are given by the students during teaching process are inferred that the Biology teachers' instructions are well understood. It is obviously seen that using the simple, common and understandable vocabulary, grammars, and language functions is quite demanded in order that the instructions understandable. If the instructions are comprehensible, the interactions between the teachers and the students become lively (Appendix 11 Extract 9).

The effectiveness of instructions does not only result from the Biology teachers' ability to use of assessable vocabulary and grammar but also their ability to use the language functions which are precise to the instructional goals. The findings of the present research provide the testimonies about the significance of the preciseness of using the language functions to achieve the instructional goals. The three Biology teachers found competent to use English that serves the functions of the interpersonal and the academic functions. As a result, they do not face difficulties in conducting the instructions. In the context of social function,

the three Biology teachers are observed being competent to use English for social functions. They almost say hello in English to the students when they open and close the lessons (Examples # 1, # 2 and # 3). In the domain of academic functions, the three Biology teachers are able to use the assessable English which serves the functions of the explanations, the descriptions, the clarifications, the comparisons, the assessments, directing the students' behaviors. See Examples #4- #35 for the varieties of the language functions used by the three Biology teachers.

The present research findings are different from the previous studies (Dwijayanti , 2008; Rahmajanti 2008; Ismuninggar,2009 and Prajarisma, P (2009) that report some Biology teachers are not proficient in using English. It was reported the majority Biology teachers get the problems to conduct the instructions. They record the restriction of vocabulary, grammar cause the Biology teachers face the difficulties when they must explain, describe, clarify, compare the theories, concepts, information , facts, direct the students to do the tasks in English. The unexpected results, the students often get confused with the academic words because the general words means different, particular and unfamiliar to the students when they are used in an academic context. The lack of vocabulary leads the students to confusion and hinders deeper understanding of the concepts.

Another study by Supriyatna (2009) reports the insufficiency of knowledge of vocabulary, grammar and inability to use language disadvantages either the teachers or the students. The teachers who lack of vocabulary, grammar and

language function understanding can stop or even rupture the communicative intents. The result is miscommunications. The inaccessible, inappropriate use of the words, ungrammatical sentences that is used by the science teachers has several bad academic and linguistic risks for the students. The ungrammatical English, academically can cause the students feel difficult to understand the instructions in the terms of understanding the theories, the concepts, the information, the facts and the given directions given. The students get bored to follow the courses. They have a less motivation to study and be reluctant to participate in the classroom activities. Further, the wrong and incomprehensible English is considered to be the wasteful language inputs and the barrier to the students' academic achievement. The students need the rights and the understandable language inputs to be the models to learn English (Krashen 1982). By hearing, listening, reading and writing the various types of words, using English is the habit for both the students and the teachers. By the time, it is quite possible using orally or in written become the culture of the teachers and the students (Teacher Support, 2006).

4.1.1 Vocabulary

Most teaching activities need a language. The language plays an importance role in the teaching and the learning episodes. It is just by the language, the teachers can communicate expressing wants, ideas, appreciations and other. Knowing the language means knowing of word. Word is a component of language that is very important to communicate in many aspects of life such as in the teaching, trade, business and so forth. A word appears in every language.

The word refers to sound sequences signifying certain concepts or meaning (Fromkin, Victoria, 2000). Considering the significance of the word in the language, the acquisition of words will contribute to the Biology teachers' communicative competence. The Biology teachers who have sufficient vocabulary are able to construct the sentences that perform its function for personal and academic purposes. Without having extensive vocabulary they will face difficulties to conduct their jobs like tutoring, questioning, greeting, expressing wants or needs, directing the instructions and other. Several instructions or teacher- students interactions will not be well manageable if the Biology teachers have least vocabulary, knowledge of grammar and ability to use a language suitable for its function (Dwijayanti, 2008;Semiun, 2009; Prajisma, 2009; Fardhani, 2011). In relation with the significance of mastering linguistic components like morphemes and sentences, Canale and Swain (1980) theorizes the acquisition of morphological rules, syntactic rules; semantic rules and lexical items lead people to be competent in using English. In addition, a thesis by Widdowson (1983) states the linguistic knowledge of language use, sentence structure and the language units of arbitrariness and accuracy of lexis choice is necessarily acquired for people who want to improve the language skills.

Academically, the restriction of vocabulary is believed as one cause of communication breakdown in the classroom (Appendix 11, Extract 7). Teaching and learning stages probably run inefficiently and ineffectively if vocabulary is least acquired. The lack of vocabulary perhaps causes the teachers stop communicating with the students which in turn may result in misinformation and

lower the students' academic proficiency. The teachers who are not rich in vocabulary probably rendered to perform the roles: lecturing, managing classroom, doing evaluation and other. Pauses, hesitancies, wordiness, and grammatical, lexical, and pronunciation inaccuracies may characterize much of the explanation, and this certainly will slow down or even hamper their students' understanding of the content of subject (DEPDIKNAS, 2006).

This present study finds the evidences of the three Biology teachers are equipped themselves with the words that are used for the social and the academic purposes. For the most part of the instructions, the three Biology teachers found using the day today and academic English words to express their instructional purposes. The words are constructed to make simple and complex sentences. See section 3.1.3 for a sample set of sentence pattern.

The research identifies the three Biology teachers using certain types of the words for three contexts of instructions. Three kinds of words are in the categories of High Frequent General Words, Non-Specialized Words, and Specialized Words. The three kinds of words are classified as subclasses of verbs, nouns, adjectives, adverbs, prepositions, conjunctions and interjections. Each word class has its own function. For example, a verb is used if the teachers want to refer to an action. Each content word is used in the several forms of sentences to express the ideas suit the Biology teachers' instructional purposes. The intensity of the use of High Frequent General Words is less than the use of the Non- specialized Words. The High Frequent General Words are used in the domain of social functions like greetings, leave-takings, appreciating the students'

works. The Non-Specialized Words are dominantly identified. The Non-Specialized Words are used in the domain of academic functions within the three contexts of instructions. This high frequency of the use of the Non-Specialized Words can be inferred that the science is rich of words. The words are used for any discussion of various contexts of living and non-living things. In this view, mastering the Non-Specialized Words is a must for the Biology teachers in order that they can do the instructions and achieve the instructional intents. In this research, the Specialized Words are least found because the given materials cover only two subtopics. See Extract 4.1 - Extract 4.10 for a sample set of vocabulary recorded in the observations.

Extract 4.1 A sample set of verbs

observe, speak up, write down, discuss, fill, continue, discuss, stand, come forward, sit down, read, write, take, open, close, make, divide, walk, see, divide, increase, know, remember, compose, elaborate, look, determine, mention, occur, repeat, find, show, keep, help, speak, listen, get, cut, continue.

The noun is used to refer to things or objects. See Extract 4.2- Extract 4.3 for sample sets of nouns and adjectives.

Extract 4.2 A sample set of nouns.

area, whiteboard, ice, leaf, frog, tree, bottle, schoolyard, flies, ant, deer, buffalos, book, hand on activities, people, friend, bottle, group, grasshopper, destruction, forest, river, fish, similarities, friend, pattern, advantage, disadvantage, answer, question, disease, ticket, fond, blood, example, interaction, wood, vitamin, sunlight, roads, place, organism, river.

The adjective is used to describe a noun. See Extract 4.3 for a sample of adjectives.

Extract 4.3 A sample set of adjectives

quiet, silent, cold, careful, small, dense, fine, loud, beautiful, clever. diligent, big, small, large, fertile, high, tall, round, hot, fresh, rotten, extinct, particular, dense, moderate, clear, loud, slow, artificial, deep, quick, different, same, natural, unnecessary, necessary, ripe, difficult, easy, true, false, wrong, renewable, typical.

The adverb is used to describe verb or adjective. See Extract 4.4 for a sample set of adverbs.

Extract 4.4 A sample set of adverbs.

carefully, loudly, quickly, slowly, well, generally, everyday, next week, last week, few minutes, long time, socially, economically, culturally, specially, naturally, approximately, usually, in the yard, in the pond, gradually, now, tomorrow, in the library.

The pronoun is used to replace a noun. See Extract 4.5 for a sample set of pronouns.

Extract 4.5 A sample set of pronouns

I, you, they, we, she, he, it, its.

The conjunction is used to join clauses or sentences or words. See Extract 4.6 for a sample set of conjunctions.

Extract 4.6 A sample set of conjunctions.

or, and, because, so, but, because, so, on the other hand, therefore, unlike, for instance, however, then, first, third, in sort.

The preposition is used to link a noun to another word. See Extract 4.7 for a sample set of prepositions.

Extract 4.7 A sample set of prepositions.

at, on, in, by, after, before, to, with, among, between, around, beside, above, about, over, for, in front of, back of, near.

The interjection is a short exclamation sometimes inserted into sentence. The interjections are used for the purposes of encouraging and motivating the students. When the students can do the works or assignments well, the teachers usually repeatedly use the interjection to appreciate them. In the context of teaching and learning, giving a reward by using verbal action can give a positive

effect. The students will be motivated to learn better. See Extract 4.8 for a sample set of interjections.

Extract 4.8 A sample set of interjections.

Wow.., hi.., good.., well..., All right….

The research provides several evidences the three Biology teachers introduce the non-specialized academic words and the specialized words. The non-specialized academic words are used across the three contexts of instruction and several language functions. The use of specialized academic vocabulary is not used to direct the students' behaviors and to perform the personal talks. See Extract 4.9 for a sample of non-specialized words and Extract 4.10 for a sample of specialized word.

Extract 4.9 A sample set of non-specialized words

examine, sample, cause, marine, human being, sample, organism, item, ecosystem, conservation, natural, controlled, fire, forest, context hunted, sustainable, exploitation, habitat, component, animal, estimate, community, niche, observe , interaction, individual, eat, get, population, sand, store, interrelated, consume, erosion, protect, survive, virus, the science bacteria, chemical, substance, function, kill, element, harmful, source, termites, produce, preserve, affect, density, food chain, provide, transfer, mineral, processes, human, organic, density, bacteria, biotic, boundary, solar, logging, legal, illegal, energy, air, abiotic, preservation, continue, and other.

Extract 4.10 A sample of specialized words

pollen, biodiversity, food chain, food web, photosynthesis, sepsis, parasitism, mutate, a, chromosome, species, host, commensalism, mutualism, predation, the balance of ecosystem, elodea, biodiversity, food chain, food web, photosynthesis, sepsis, parasitism, mutate, chromosome, species, host, commensalism, mutualism, predation, the balance of ecosystem, elodea, pollen, omnivore, herbivore.

Linguistically, three types vocabulary which are introduced by the Biology teachers become the meaningful language inputs to enrich the students' English vocabulary. The given words can refresh the students' memory of the meaning, the spelling and the use of the words. For some opportunities, the students often

learn the new vocabulary and know how to use it. The vocabulary enrichment is frequently done when the new topic is presented. The Biology teachers provide a list of vocabulary before starting the new topic (Appendix 12). A broad range of classroom activities are designed to promote the students' English skills and enrich the student's linguistic knowledge of English (vocabulary, grammar, and language function).

Intensifying the use of English by giving tasks, questioning and answering, discussing, debating, doing presentation, writing lab report, and other tasks in English, theoretically claimed to be the good ways to train the students' communicative skills (Teacher Support, 2006). The same thesis is generated by previous studies in foreign countries that found teaching a science in English makes the students' speaking ability and mathematics achievement improved (Lambert,1972, Swain and Lapkin, 1982, Genesee, 1983, 1987, 1991, Cohen, 1995, Baker, 1998 and de Courcy, Warren, & Burlon, 2007). A thesis by Krashen (1982) also explains that the language can be acquired if the comprehensible input available to the language learners. He highlights the English language which is learned in the classrooms can naturally develop the students' English.

4.1.2 Grammar

Having communicative competence is a mandatory requirement for the Biology teachers who must use English as a medium of instruction (Directorate General of Junior High School Management, 2007 (b)). Talking about the communicative competence is talking about a concept of a grammatical competence or linguistic competence and a discourse competence once proposed

by Canale and Swain (1980). According to Canale and Swain (1980) the grammatical competence is an ability to comprehend and manipulate the lexical and grammatical structure of language while the discourse competence is an ability to understand and use an appropriate text structure. In my study, the Biology teachers' communicative competence refers to the vocabulary mastery, the ability to put the words in the grammatical sentence pattern that performs its functions appropriate to the certain instructional purposes.

4.1.2.1 Sentence Pattern

The observations capture the three Biology teachers using the simple and the compound sentences for the instructions. When the Biology teachers express one idea they usually use the simple sentences. It was found the compound sentences are used when the Biology teachers express two or more ideas in a sentence. The simple sentences are dominantly used because the Biology teachers are competent to make such sentences and the students know best these patterns. One reason for using the simple sentences is to secure the students' understanding of instructions. The Biology teachers believe that the students can understand better what they talk about if the instructions use the English simple sentences (Appendix 12). The Biology teachers most frequently use the simple sentences for greeting and leave-takings (the social function) and giving short directions, explanations, descriptions, clarifications to the students (the declaratives and the imperatives). Since building the simple sentence is in the reach of the Biology teachers' English proficiency level, not too many grammar mistakes are identified. Using the simple sentences seems to be effective to achieve the

instructional purposes. It can be seen from the students' participation in the teaching and learning activities. Mostly, the students get involved in the classroom activities. They do not just sit, watch and listen to what the teachers are doing and explaining but rather than do activities to follow the teachers' instructions.

The compound sentences are used only for the instructions that are not possibly transferred using the simple sentences. The biology teachers are observed avoiding using the complex sentences to lower the students' difficulties in understanding the given instructions. The long explanations, descriptions, clarifications and directions usually need the use of the compound sentences. See Extract 4.11 for a sample of simple sentences.

Extract 4.11 A sample set of simple sentences

- How are you today?
- Who is not present today? I will call you
- Are you ready?
- Ali, Lia, and Tatik are absent today.
- Our topic today is about population.
- We continue our lesson last meeting.
- We will make a conclusion.
- We will meet next week.
- It is time to finish our lesson.
- We run out of the time
- You must draw and mention the organisms!
- You will draw one organism you observed.
- Each group will draw.

Performing the simple and complex sentences is feasible for the instructional purposes because these two patterns are in the reach of English proficiency level of the Biology teachers and the students (Appendix 11, Extract 9). The students have recognized, learned and understood these two patterns since

the students were in the Elementary school. See Extract 4.12 for a sample of complex sentences.

Extract 4.12 A sample set of complex sentences

- A farmer plants trees in his garden to prevent erosion. The trees can protect the soil from flood. Sunlight, water, and temperature are important factors that determine what kind of plant can grow on a certain ecosystem. Soil contains nutrition which is needed by the plants.
- Have a look on me what can you say about the interaction between an orchid which was stuck on a tree?
- Do you think that the orchid can get sunlight easily when it lives in a small tree?
- Observe carefully everything in the area which you have marked and note down everything you found.

The Basic English sentence that consists of a subject plus a predicate is used. The subject is a noun phrase (NP). The predicate is a verb phrase (VP). This Phrase-Structure rule is used to make the declarative or affirmative sentences (to say something or make something known to the students). For example, “a cat eats a mouse”. The subject of the sentence is “a cat” (NP). The predicate is “eats a mouse” (VP). In some cases, the Phrase-Structure rule is transformed into another grammar model when the Biology teachers ask a question or give an order. A change of the position of verbal element is changed along with the functions of the sentences. For example, the change from affirmatives to the interrogatives is done if the Biology teachers question the students. The interrogative form is used to ask question or request. The imperative form is used to give an order. In the interrogatives, some helping verbs like do, does, and Aux like can, May, must, shall and put at the beginning of a sentence rather than after a subject NP. For example, “Does a cat eat a mouse? From the angle of the teachers’ interest, using the simple interrogative patterns “yes” and “no’ is not complicated and relevant to the content subject level difficulty. From the students’ point of view, the question

patterns “yes” and “no” is easy to understand. Like what the Biology teachers have done with the interrogatives, in the case of the imperatives, a verb phrase (VP) comes solely, for example, “come forward!” .The short form is considered to be effective to transfer the message to the students and easy to do. In some cases, to show the politeness and the respects, the Biology teachers usually start the imperatives with the Aux (can, will, must, shall, may). For the example: will you come forward?”, “Can you tell me…”? (Example #18)

The choice of simple grammar does not just consider the English proficiency level possessed by the Biology teachers but also the students’ proficiency level. Krashen (1982) makes a thesis that comprehensible input will understood if the input consists of form and structure which are not beyond the learner proficiency level in a language. Besides, what the three Biology teachers really intent with their words (what the Biology teachers expect, tell, who they talk to) will determine the use of grammar. For example, in asking questions (interrogating the subjects, objects and verb) the three Biology teachers often use the wh-questions and How or the affirmative pattern with the rising intonation. They begin with one of wh-words: who, what, why or where. They use also a variety of questions that need the answers a “yes” or “no” (regular yes/no question). In some cases, a passive form is used when they emphasize the significance of a subject.

Declarative, interrogative, imperative and exclamatory are model grammars used by the three Biology teachers (See Extracts 4.13 for a sample of the declarative sentences for the science explanations and Extracts 4.14 for a

sample of the declarative sentences for the science description). These three model grammars are concurrently used in the three contexts of instructions to establish the students' academic achievement. Linguistically, the concurrent use of four types of sentence patterns can train the students' cognitive thinking. They are trained to point out the differences of the use of grammar patterns. To the majority students, the interrogatives, the imperatives and the exclamatory are not new forms. Most students can understand a sentence meaning which is embedded in the patterns that they know well (Appendix 12). Academically, the frequency of using the four types of sentence patterns is a meaningful medium to ensure whether the three instructions (directing behaviors, science instruction and vocabulary instruction) understandable to the students.

In the context of a science instruction, the declarative is used to explain, describe the scientific concepts and facts, theories and to give information. In the context of application of instruction, the declarative sentence is used when the Biology teachers explain and direct the students do the tasks. First, the Biology teachers introduce the general topic or type of task; then they use a short sentence to explain the details. According to the Biology teachers, building the short sentences is not very difficult. Besides, they think the short sentences can facilitate the students' understanding of the knowledge of topic they teach. (Appendices 11 Extract 9 and 12).

The three Biology teachers read a textbook, hand-on activities or the text of a worksheet to highlight the science instruction, task direction, vocabulary instruction they are explaining. In the context of the students' assessment, the

declarative sentence spoken with a rising intonation is sometime used to propose a question (implicit per formative utterance). T20 uses the declarative sentence instead of the interrogative to know whether the students understand the explanation by saying "you understand my explanation". Austin (1962) states what a speaker really intents are sometime made in implicit per formative utterances. In my study, the example of utterance by T20 linguistically is a declarative or affirmative sentence. In broad sense, the sentence can be an interrogative since it is spoken in a rising intonation.

Extract 4.13 A sample set of the declaratives for the science explanation

The light comes. The plant has leaves like a dish, a satellite dish, to get light.
There is a population in an ecosystem.
Ecosystem consists of two communities: a biotic and biotic
There is an interaction between biotic and a biotic ecosystem

Extract 4.14 A sample set of the declaratives for science description

The sun is the main source of energy for all organisms on the earth. Green plants need this solar energy to produce food. Animals and human beings get energy by plants and other organism that also eat plants to get energy.

The declarative is used for a comparison. For example, T 23 compares two scientific concepts from herbivores and omnivores to highlight the similarities and the differences. See Extract 4.15 for a sample of the declaratives for a comparison.

Extract 4.15 A sample declaratives for a comparison

Herbivore is an animal that only eats plants while omnivore is an animal that eats all kind of food both meat and plants.

The interrogatives are often used by the three Biology teachers to assess students' knowledge. The Biology teachers require the interrogatives to ensure a shared meaning of the instructions can be understood by the students. The interrogatives are frequently addressed to the students. The Biology teachers are

aware that the primary focus is to make the students understand the given knowledge. Hereby, the interrogatives are frequently addressed to the students (Appendix 12). The interrogatives often begin with a question word, what, why, and aux. The interrogatives are sometimes used for the clarifications. See Extract 4.16 for a sample of the interrogatives for the students' assessment and clarification.

Extract 4.16 A sample of the interrogatives for the students' assessment and clarification

- What zebras need to survive?
- What is biosphere?
- What did we learn in our last unit on protecting rare animals?
- What rules are to be obeyed?
- What is population?
- Why are preservation efforts necessary?
- Can you tell me what you already know about preserving plants?
- What will happen if the exploitation of plants is out of control?

In some ways, the three Biology teachers clarify the scientific concepts and the tasks by using the parallel structures: two adjacent sentences without connectors (e.g., instead, because, etc.). For example, the first sentence often is a negation for clarification and followed by a parallel clarification (Extract 4.17).

Extract 4.17 A sample of parallel structure

- We're not studying the river.
- We're doing a model

The possessions of knowledge of grammar enables the three Biology teachers speak grammatical English. Accordingly, the English is understood by the students. They speak slowly and clearly. They read the hand-on activities, the text book, sometime do the words repetition to correct their pronunciations, search the understandable sentences, check and recheck the spellings with the dictionary (Appendix 12).

4.1.2.2 Tenses

By the definition, tense is a variation in the form of a verb to indicate the time of action or state expressed by the verb (Cheong, Lee Kook, 1986: 90).The past and the non-past tenses are identified in any sentence forms across several instructional contexts. The non-past tense includes the present tense and the future tense. The Biology teachers are observed modeling how to use the past and the non-past tenses. The non-past tense is used to refer anything that is not in the past. When describing a concept, theories, the three Biology teachers use a non-past tense (the simple present and future tenses) and the connector *like* for a description. Introducing the general topic or type of task, explaining the details, and rereading the textbook or the text of a worksheet to highlight the task directions, making clarifications, paraphrasing, directing instructions, and directing the students' behaviors are shown through the use of either the non-past or past tenses. See Extract 4.18 for a sample of the use of the past and non-past tenses.

Extract 4.18 A sample of the use of the past and non-past tenses

- You will examine the effect of temperature to a fish's respiration rate.
- The gill opened faster in low temperature than in high temperature.
- Did this experiment support your hypothesis?
- The diversity of organism will be discussed next week.
- How are you today?
- Do you remember the topic?

The Biology teachers use a variety of sentence structures when they paraphrase their utterances. They paraphrase in a simple sentence that contained specialized (science terminology) or non-specialized academic words that are difficult to understand. They sometime rephrase the sentences by using longer

sentences and more complex word order (syntax) but the students seem understand the utterances because the words are recognized by the students .

4.2 The Language Functions of English Used by the Biology Teachers

One more significant aspect of language use is about language function. Brown (1987) states communicating idea, feeling in language to other people does not only need mastering the linguistic knowledge but also needs the knowledge of language function. Some references mention language is used for purpose of expression of feeling, investigating reality, a way of learning about things, communicating about something, of expressing proportion (Halliday, 1973). Van Ek's (1980) writes language is used for several purposes like imparting and seeking factual information, identifying, reporting, describing, narrating, asking, correcting; expressing and finding out intellectual attitudes, expressing agreement and disagreement, inquiring, offering, denying, expressing and finding out emotional attitudes, hope, satisfaction, pleasure, worry, fear, desire, expressing and finding moral attitudes, granting forgiveness, getting things done ,suggesting, inviting, warning, socializing, greeting, meeting people.

Allwright and Bailey, 1991) in Rod Ellis (1994) say language is needed when tutoring, instructing, drilling, asking questions, testing, providing information and assisting the students understanding of the content of science. The purpose of instruction is to make students understand knowledge imparted to them by the instructor. In this situation, the success depends much on whether students are able to do something the teacher has told. On the basis of this perfective, the teachers' ability in using effective English as a means of instruction is a must.

The review of the language functions previously noted (4.2 paragraphs 1 and 2), suggests the significance of having competence in using appropriate English to achieve a communicative intent and make students understand knowledge imparted. Cummin in Thomas, C & Collier (2002) proposes two language competences that must be possessed by the teachers if a science taught in second or foreign language. First, the acquisition of Basic Interpersonal Communicative Skills (BICS); language of social interaction/conversational language such as greeting, make salutation, share feeling, apologize or make regret, offer compliments, asking things, and requesting assistance. Second is Cognitive Academic Language Proficiency (CALP). CALP refers to the language patterns and concepts required in processing, understanding, and communicating curriculum–based content. CALP is the language used by a teacher and student for the purpose of acquiring knowledge and skills, describing abstract idea and delivering students' conceptual understanding such as the language to argue, debate compare, contrast, synthesizing, drawing conclusion, convincing other people, giving information etc.

The data gathered in this research convey evidences three Biology teachers are competent to use English for the social functions (BCIS) and English for academic functions (CALP) in the three instructional contexts. In the matter of BCIS, English is used (1) to express individuality, (2) to direct the students' physical behaviors and (3) to direct instructions. In the domain of academic functions (CALP), English is used for (1) explanation, (2) description, (3) comparison, (4) assessment, (5) clarification, and (6) for paraphrasing. To avoid

the misconception, it is necessary to explain the terms instructional context and the six terms for language functions. Citing the ideas of Bailey, Alison L (2004) and Cambridge International Dictionary of English (2010) the term definition is summarized as follow. The term ***instructional context*** refers to ***applying instruction to assist students in classroom activities*** (asking the students to do things, directing the instruction and so on), ***science instruction*** (teaching the theories, the concepts, and the facts), and ***vocabulary instruction*** (introducing explicitly or implicitly vocabulary). The term ***language function*** refers to **e*xplanation*** (to make clear or easy to understand by giving information, to give reason for), ***description*** (to say or write what something is like, to provide a verbal picture), ***comparison*** (to examine or look for differences and/or similarities between two or more things), ***assessment***, which for the purposes of this study is defined as the informal evaluation of the students' comprehension and knowledge during the course of a lesson, **c*larification*** (to make clear or easier to understand by giving more details or a simpler explanation), ***paraphrasing*** (to repeat something written or spoken using different words, often in a simpler and shorter form that makes the original meaning clearer).

4.2.1 The Language Functions of English in the Application of Instruction

The social function of English is used to express individuality, direct the students' behaviors and direct the instructions during the application of instruction appears in the opening class, while teaching and closing classes. The Biology teachers most frequently greet the students by using the day-today English conversation when they start teaching. The greeting means to establish a good

interpersonal relationship in social community in the classroom. In the opening class phase, one Biology teacher does not only use the English that serves a function of interpersonal talk like doing a roll-call attendance but uses English for activating the students' prior knowledge and the assessment of the students' understanding of the lesson has already been taught. In the closing class stage, the Biology teachers converse with the students using English to stop the lesson. The conversational English is built up using a simple word order that is very common to the student's ears. See Extract 4.19 for a sample set of English expressions for greeting and Extract 4.20 for a sample set of English for leave-takings.

Extract 4.19 A sample of English expressions for greeting

- Good morning students.
- How are you today?
- Fine, Mam..., and you?
- Very good, thank you.
- Who is not present today? I will call you
- Juli. She is sick.
- Okay, let's start! Are you ready?
- Hello, Good afternoon everybody! Nice to meet you.
- Who is not in the class today?
- Ali, Lia, and Tatik are absent today.
- Can we start?
- Who is not in the class today?
- Ali, Lia, and Tatik are absent today.
- Do you remember the topic last meeting?

Extract 4.20 A sample of English expressions for leave-taking

- Time is over.
- Let's stop now!
- Finish! We will make a conclusion.
- We will meet next week.
- The result of your test, I will give you next week.
- See you next week

As stated by Austin (1962) when someone uses a sentence in communication, she/he means more than what she actually says. The listener understands a meaning directly or indirectly conveyed by the spoken sentence.

The same thing happens when the three Biology teachers produce the utterances, they mean more than what they really say. When the three Biology teachers say: “How are you? “Let’s start!”, “it is ok! Let begin the lesson!”, “can we start? (Extract 4.1 and Extract 4.2) possibly mean asking information, getting the students’ attention. In the sentences “Let’s stop now”, “Finish!”, “we will make a conclusion”, “we will meet next week” do not only imply a leave-taking but can also implicitly mean a request. The sentences perhaps mean that the Biology teachers intend to remind the students of the lesson by synthesizing the lesson materials. The Biology teachers mostly use the explicit instructions to help the students understand the tasks and actions necessary to complete. The implicit instruction is rarely used.

In the context of process/application instruction the students are engaged in classroom learning activities. The Biology teachers encourage the students to be creative and participate in the learning activities by providing charts, pictures and collaborative work. Frequently, the students shift the tasks at least once during the lesson (i.e., lecture to group work, discussion, and presentation). Many tasks are communicated well such as a collaborative use of microscopes in a laboratory or work in pair etc. Although the student participation is not focused during observation in this research, there appear the students feel free to question and give the answers. The students are required to raise their hand or wait to be called upon for a response. Most Biology teachers observed most using the direct instruction practices in their teaching. See Extract 4.21 for English used to direct the instructions and the students’ behaviors.

Extract 4.21 A sample of English used to direct the instructions and the students' behaviors

- Speak loudly!
- Get attention, please….!." Attention in here!
- Choose a small area around the school!
- Observe carefully everything in the area which you have marked!
- Note down everything you found!
- Classify things that you observed into two groups: living things and non-living things!
- Observe whether the living things affect non-living things!

In the application of instruction, several language functions of English are recorded**.** The three Biology teachers use language functions of the explanation to guide the students understand the tasks. In example #4, T20, T23, and T25 start the lesson by explaining the students find out the organism in a certain place (school backyard). They explicitly state the scientific content of lesson (organism) while introducing the task (organism classification).The explanation to accomplish the task is used to present students with instructions to help them accomplish the tasks. The three Biology teachers explain how to participate in a food chain game, categorize knowledge about the diversity of organism, produce a forest creature crossword puzzle, and more. In example #5, T20 explains how students should use their worksheets to discover an organism should be a part of some different food webs. In this exercise, the students are required to consult a series of questions on a worksheet to discover the interconnection of organisms. The Biology teacher explains how to complete the task by using a worksheet to make the conclusion about the food webs.

The description to accomplish task is also used to present instructions and techniques for accomplishing tasks. The Biology teacher describes how to invent new fish species, create models of the river, and among other. In example # 7, T23

describes how the students will participate in a lab demonstration on ecosystem in a bottle.

English is used to assess whether the students understand the tasks. In the 7th grade class of T20, the example #8, the students are asked to fill the two columns in the worksheet. They are asked to categorize organism that they find in the small garden near the class into living and non-living things.

The language function of clarification is used to clarify and repair the misunderstanding of completing task. In example #9, T25 states that the students will create a model of ecosystem in a river. When it becomes apparent that some students are still confused of the task's purpose ("are we studying the river"), the Biology teacher provides the repair ("we are not studying the river itself"). "We are just doing a model".

The clarification to accomplish task is used to ensure that the students understand the instructions for accomplishing tasks. Task clarifications are observed in some instances. Some clarifications are the students initiated and some others are the Biology teachers initiated. In example # 9, T25 gives instructions for the students to draw an animal of the same species in a forest. After the teacher presents the task instructions, the students ask many questions about the assignment. There are three students initiated a conversation repair to clarify the instructions. The Biology teacher clarifies the concepts using the sentences that can be understood by the students. The Biology teacher starts with "You're supposed to…," "It must be...," and "Only do..." The use of these features of English alerts students to pay attention to the direction. Because the

Biology teacher has already explained to the students that the animal must be the same species, the student's question is an initiation of a repair. The Biology teacher repairs the communication failure by restating her original direction, "Yes, must be the same type species."

In another example, T20 asks the students to conduct an experiment to investigate how temperature affects the organisms. The students are requested to examine how the change of the temperature affects a goldfish's respiration rate. As the students conduct the lab experiment, the Biology teacher initiates a clarification of the task as follows. T20 says to an individual student. "*You're supposed to observe and write on your paper*". In this example, the Biology teacher has assumed that the students understand the original directions presented, "*observe and write on your paper."* The clarifying repair is clarified by the marker, *"You're supposed to"*. This sentence is used because it has the implication that the students should *already* know the task directions.

4.2.2 The Language Functions of English in the Context of Science Instruction

The given materials are aimed to promote the discussion and the students' interest. Perhaps, due to the topic, the relevancy to the students, or the teacher and student style of interaction, the students participate dynamically. The teaching practices observations find the integrated language functions of explanation, description, comparison, assessment, clarification, and paraphrasing used in the process/application of instruction. The instructions/techniques to accomplish a task most frequently use the explanation, the description and the clarification.

In the context of science instruction, it is identified the functional categories of explanation (Examples #14 and #15), description (Example #16), comparison (Example 17), and assessment (Examples # 18, #19 and #20). The additional categories such as synthesis and summation are used (Example # 20). There is little clarification (See Example #21) used in the conceptual instruction for the repair strategies. It seems the students do not need for clarification of science concepts. The clarification is often done in the case of assessment and directing the students to do activities or task in the classroom.

To facilitate the 7th grade science instruction, the Biology teachers use the oral language functions of the explanation, the description, the comparison, the assessment, and the repair strategies of clarification and paraphrasing. These language functions are used to help the students reduce the barriers to understand the language of science and to ensure the instructions already understood. The Biology teachers use the explanation to introduce a science lesson topic. In examples #14 and #15, T20, T23, and T25 start the lesson by explaining students search the organism in a certain place (school backyard). The Biology teachers explicitly state the scientific content of lesson (organisms) while introducing the task (organism classification).

The explanation is most frequently used to demonstrate scientific relationships, make scientific concepts understandable and give reasons for scientific theories and experiments. T20 explains the mutualism and T25 gives an explanation about a relationship between lice and dog's blood. They say the

interaction between these two organisms is called parasitism because one organism gets some advantage and another organism get disadvantage.

The teachers also use the language function of explanation to make scientific concepts understandable. They explain some of the scientific concepts organisms in the bottle, the sunlight, diversity of organism in an ecosystem, and photosynthesis. In example #14, T23 explains the function of sunlight for all organisms. In example #17, she explains how the diversity of organisms develops.

The language function of explanation is also used to give the scientific reasons for theories and experiments. In the lab of T23, the Biology teacher introduces the scientific process of the effect of oxygen on the fish. She explains to the students that a scientist takes two fishes. The fishes are put into two beakers of different temperature. One fish is in the warm water and another one is in cold water. The experiment shows that the respiration rate of the two fishes is different. The fish in warm water breathes faster than in cold water. The students then practice this scientific process. After the lab is completed, the Biology teacher introduces the concept of the oxygen role in the water and then explains the reason why.

The three Biology teachers use language function of the description to provide the students background knowledge of scientific concept. The description is done by relating a real world and a science. In examples #15 and #16, T23 and T20 describe an ecosystem. They tell the students that organism can live at any places such as in the ocean, in the forest, the backyard and more. T20 tells a story of her experience when she gets a pond in the back of her house in the morning.

She sees a frog near the bank of pond is surrounded by insects. She is approaching the frog to see what it is doing. Suddenly, its tongue stuck outward catching an insect. This story illustrates sequences of events in an ecosystem. Connecting the real-life story and the science is a strategy to promote the students' interest and activate their previous knowledge. In a different example, T20 describes how organism interact one to another. She introduces a farmer, trees, wind, soil sunlight, water, temperature.

The description in science instruction is used to provide the students' mind with scientific concept. The Teachers describe food chains, sand erosion, and photosynthesis and so forth. One Biology teacher describes the process of photosynthesis. She tells to the students that a plant makes its own food by taking light from the sun. In example #16, T20 describes how a plant absorbs light through its leaves. In example #20, the Biology teacher makes an analogy the leaves of a plant to a satellite dish to help the students imagine in their minds how the flat and long leaves move toward the sun to absorb as much light as possible.

In the context of science instruction, the language function of comparison is used to compare a new scientific theory, concept, or fact to another theory, concept, or fact that is understood by the students and the similarities and differences among two or more scientific theories, concepts, or facts. In the need of comparison, the Biology teachers introduce new scientific theories, concepts, or facts by comparing them to other theories, concepts, or facts that the students have already known. They give a series of comparative questions. This technique is used to activate the student's prior knowledge and assess the student's

understanding of concept. In example 17, T20 discusses the difference between population and individual.

In the context of science instruction, the language function of assessment is used as an informal method of determining the students' prior knowledge and whether the students have learned the scientific concepts that have already been taught. The Biology teachers initiate the lessons by asking the students what they have already known about a scientific concept. In example #18, T25 is very explicitly assessing the students' prior knowledge.

When the Biology teachers begin the lesson, they often assess whether the students have understood the science materials offered. In example 20, T25 assesses what kinds of the human activities threaten the variety of organisms, how preserve rare animals, how a particular organism affects another organism, and more. She explicitly states that she is assessing a concept that she has previously taught. Because the teacher has already taught a unit on preserving rare animals, she expects the students can answer her question. In example #19, she also uses assessment to connect the new science lesson on human effort to preserve varieties of organism to the previous lesson on preserving rare animals.

The language function of clarification is used to repair misunderstanding of scientific concepts. In example #21, T25 explicitly explains that scientific models replicate what happens in nature. As the students create a model of river water, she explains to them that the model is not a real river. The scientific model allows the students to understand how the river works in nature without having to visit an actual river. At a subsequent class meeting, she opens the lesson by explaining

that the students will make a model of the river. A student asks *"Are we studying a river?"* The teacher responds "*We're not studying the river"*. *"We're doing a model"*. Since the Biology teacher has already explained the purpose of model in the previous lesson, she initiates a repair to clarify the distinction between scientific models and real nature.

4.2.3 The Language Functions of English in the Vocabulary Instruction

This section addresses the ways the Biology teachers support the students' understanding of English vocabulary used within the phases of teaching and learning. As previously noted (section 3.1.1) three types of vocabulary are used by the Biology teachers. In the domain of the high frequency general words, namely the day today words used in the personal conversations, the three Biology teachers do not need the language supports to make the vocabulary understood. Both the teachers and the students habitually hear the words in the classroom or public places or from television broadcasting. They regularly use the words in the classroom for greeting, leave-takings, giving rewards and punishments, encouraging the students, and other.

The different case happens when the three Biology teachers explain, define and describe a specialized term or concept using the non- specialized academic words or the specialized words. They need a strategy to make the words understood by the students. As stated by Rosenthal (1996), Henderson and Wellington (1998), and Cummin (1999) Cummin (1999) the language used in science is decontextualized, more abstract than social language. This means that the events or topics being described to the students are difficult to understand. The

conceptual terminology of science is formal, more abstract, and more technical. Due to the level of difficulty found in the specialized academic word (science terminology), language support is needed when the teacher's efforts to deliver the meaning get failure and the breakdown of communication happens.

The observation finds the Biology teachers helping the students understand new words (such as "food chain") or ordinary words used in an academic domain (such as "energy") by providing a list with all the new words right at the beginning of a new unit of lesson and sometime, "explain" or "convey" the meaning associated with these words. By this way, the students will understand the meaning of these words from the context and can use them appropriately when needed. Considering the large number of technical terms used in science, it is not logical to expect the students store and memorize all words. The three Biology teachers teach them not only through hand-on activities but also such experiences with using concrete objects, pictures and visuals, followed by discussions that the scientific meanings of such words can be used. See Appendix 11 no 4 for sample of pictures used for vocabulary instruction.

In some ways, the Biology teachers introduce the academic vocabulary without stating the meaning directly. The reason given, academic vocabulary is not easily transferred into the students' understanding because of its abstractness (Appendix 11 extract 8). With this view in mind, the Biology teachers do both the explicit and the implicit supports to help the students understand the meaning of the vocabulary in academic contexts. The explicit support means a direct and exact assistance. The implicit support means an indirect help. Two kinds of

support are generally done by giving definition, providing an example, synonym, or repetition of the words. These steps are taken to serve the description, the explanation and the clarification. The Biology teachers often give informal rather than explicit definitions for new specialized vocabulary words. They frequently define a term and verbal definitions which are cited from the dictionary definitions (See Appendix 12). .

In example # 22, T25 explains the word ***preserve*** by offering the explicit definition, "***It means you protect it from changing or stopping".*** Another example, she explains the meaning of the word produce. When plants ***produce*** *leaves and flowers," the words* ***produce means as a result of process****"*

In example 24, T20 uses a definition in description to help the students understand the meaning of *population*. She describes the characteristics of population in the classroom such as the size of population, where the members of classroom population live, and how they can survive. In example #24, T20 uses the definition in clarification to teach the meaning of the specialized term *biosphere.* T20 asks the students what is ***biosphere****?* One student answers ***water surface***. The student gives a wrong answer that is ***"water surface"*** the teacher thinks she needs to make a conversational repair to clarify biosphere is not water surface. First, she initiates the repair by stating, "***biosphere is not water surface'."*** This repair assures the student that the student understands of the teacher's original definition of *biosphere* is not correct. Then, she repairs the misunderstanding by clarifying that "***it is the earth's surface and atmosphere which is inhabited by the living things".***

Paraphrasing in clarification is often done for the vocabulary instruction. In examples # 31 and #32, T20 wants to know the students' response to what interaction patterns they call between an orchid and a tree? Why is it called commensalisms? When she does not get the correct answer, she responds by rephrasing her request to repair the communication.

To support academic vocabulary learning, the Biology teachers use also synonyms within conversation without explicitly stating that they are providing a synonym for understanding. The synonym is used for explanation, description, clarification and to direct the instructions. The use of definitions requires teachers to clarify and the use of synonyms often require teachers to paraphrase whole sentences. In some cases, the terms are found to have precise scientific meanings as well as non-academic discourse usage (e.g., for the word *pollen or powder* is an example of a scientific use versus a non-academic use "*to by powder in "Sari Ayu" counter*. The nonacademic meaning of the word (Every day English) is often more easily recognized by the students. Thus to assist the students understand the academic word (science terminology), the Biology teachers introduced it by the observation or the phenomenon occurred in the real life.

In example #26, T25 uses the synonym in explanation. She introduces the word *solar* as a synonym for *sun.* She says, "…. I like the word *solar*, it is a science word." She writes the word *solar* in brackets after *sun* on the whiteboard to highlight the synonymous relationship of the two words.

In example #29, T20 uses the synonyms in description. She describes the *powder* she observes, and a student offers the synonym *pollen*. She then uses the conjunction *or* to reinforce that *pollen* and *special powder* are synonymous.

Synonym in assessment is also used to assess whether students understood the lesson. In example #28, T25 offers the synonym *affect* when she knows the students might not have understood the word *influence.*

Synonym in clarification is used. T25 asks the students "*what zebras need to survive. Students answers "food," "water," and one student answers "space"*. She initiates a repair to clarify the difference between the no specialized term, *space*, and the specialized term, *shelter*. She alerts the student that his response is not entirely correct by asking, *"What is that called?"* She then finishes the repair by stating the target word, *shelter*.

In one instance, T20 uses the synonyms in directing instruction. She demonstrates a science experiment that investigates the ecosystem in the bottle. She uses synonyms to clarify the task instructions. While directing instruction (Example #30), the teacher uses the no specialized academic words, *explain, conclusion,* and *judgment*.

The Biology teachers also use visual synonyms to support vocabulary learning. This technique is similar to the Total Physical Response (TPR) method commonly used in English as Second Language classrooms. T23 discussed the behaviors of mosquito beat her hands, while telling the students this, she places a hand on her own hand region.

The Biology teachers also use several examples to support the academic vocabulary learning. The examples are used as the media to assist the students understand the meaning of terms and activate the students' prior experiences (Appendix 12). In some instances, the Biology teachers may incorrectly assume that the students will understand her examples. In this position, the students need the examples in order to understand the explanation and the description.

One Biology teacher defines a term by breaking it into meaningful parts by using the example in explanation. In example #33, T20 explains the term *photosynthesis* by telling the students, "*All kinds of plants have different ways to get light. Photo* means light…*synthesis* means put together. Thus, *photosynthesis* means put together light. In this way, the Biology teacher provides a definition to support the student understanding of new vocabulary while supplying the students with word-analysis technique for later learning.

It is observed T25 using the examples in description to instruct the vocabulary. She offers an example to help her students understand the meaning of the term *dense*. In example #34, T25 provides many descriptions. She compares food cake ("that's not very *dense*") to brownies ("much more *dense*") in order her students understand the meaning of the term *"dense"*. She also repeats the term.

Aside from using several general language teaching approaches as previously depicted, the Biology teachers observed prepared also glossary/list of words before starting a new lesson. To communicate the meaning and help the students remember the vocabulary, concrete experiences like doing the experiments in the live laboratory (in the yard and the garden) are done. The

instruction of specialized vocabulary appears more than non-specialized vocabulary. The Science-Biology found rich of the words, the sentence patterns. The classroom activities are filled with the words and the sentences patterns. The Biology teachers are observed using the examples in the process of providing the description, the explanation of science concepts (Examples #3-#34 and Appendices 11 and 12).

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

This chapter contains of two subchapters (1) conclusions and (2) suggestions. Each sub-chapter is presented in details as follows.

5.1 Conclusions

Referring to the reviewed literatures, findings of research and result of data analysis, the researcher can draw the conclusions as presented in next brief elaborations. Three observed Biology teachers can be called the effective teachers. They possess the pedagogical competence that is prescribed for the science teachers of *SMP RSBI* by the Department of National Education and Culture (the law no 14, the article 8 of Chapter IV). They do not only master contents of subject but also have English competence in the term of working English proficiency level demanded by certain contexts of instructions. The English competence of Biology teachers can be seen from the mastery of three language aspects. The Biology teachers have knowledge of the vocabulary and grammar of English, and the language function of English. They are capable to employ these three language aspects in three contexts of instruction. Accordingly, the students can understand all instructions.

The appropriate use of vocabulary, grammar and language functions of English produce effective instructions. The effective instructions, then, advantage the students. By effective instruction, the Biology teachers can prevent the students' misconceptions and the communications breakdown. The success of

instructions is proved by the students' high level participation and motivation in the teaching learning process. Mostly, the students give positive responses when the teachers do the instructions. They can understand the teachers' orders, explanations, description, clarifications and information and do all the tasks.

The vocabulary which is well employed by the Biology teachers covers three types of oral English: High Frequency General Words, Non-Specialized Academic Words, and Specialized Academic Words are taught to the students through three contexts of instruction (application of instruction, science instruction and vocabulary instruction). These three kinds of vocabulary are classified as subclasses of part of speech verbs, nouns, adjectives, adverbs, prepositions, pronouns and conjunctions. In the domain of social functions, the findings show that no language supports appear when the Biology teachers must use these words for the personal conversations in the classroom. Both the Biology teachers and the students can recognize these ordinary or non-academic meaning of general English

A different case happens when the Biology teachers must use the academic words. The three Biology teachers are found using the scaffolding strategy to lower the abstractness, the uniqueness, the level of difficulty and the particularity of academic vocabulary. Several ways are taken by the three Biology teachers to avoid the students' misunderstandings. Three Biology teachers are observed struggling to solve their instructional problems. They help the students get the meaning of the introducing academic words by employing certain instructional strategies. They do highlight the academic vocabulary in the subject they teach by

using the language switching, doing translation from English to Indonesian, giving definitions, providing synonyms, examples, visuals, the real objects and doing repetitions, description and the explanation of science concepts to transfer the meaning of words to the students' understanding.

Several figures are introduced to the students when the teachers describe the interaction between organisms in certain ecosystem. When they explain the concept of parasitism, they are found providing the examples, simile and comparison. They apply also the general approaches of language teaching. They prepare glossary/list of words before starting a new lesson. In a certain case, Total Physical Response seems to be effective to instruct the vocabulary. Last but not least, the vocabulary instruction involves the students in a contextual learning. The Biology teachers ask the students do concrete experiences like doing the experiments in the live laboratory (in the yard and the garden) to communicate the meaning and help the students remember a wide range of extensive vocabulary (the Example #26-#34 and the appendix 11 no 4).

Beside vocabulary mastery, the English competence of three Biology teachers is indicated by the ability in using grammar of English. The data expose the facts that the teachers are competent in using acceptable sentence patterns and tenses of English. The identified sentence patterns cover the use of declaratives, interrogatives, imperatives and exclamatory. Declaratives are used to explain and describe concepts, to give tasks and information, to do clarification and to direct the students do activities. In some occasions, the Biology teachers use the declaratives with a rising intonation for a question. Austin (1962) names it an

implicit per formative utterance. Linguistically, the form is declarative or affirmative but the illocutionary (what the teachers really intent) is to request information or to question. To assess the student knowledge, the Biology teachers apply the simple interrogatives. The interrogatives mostly begin with what, which, how, who, to be (is and are), modal (can, will, may). The Biology teachers sometimes use short interrogatives to make clarifications. The exclamatory usually appears within three teaching stages: the opening, while and closing the lesson. The exclamatory is used when the Biology teachers give the motivations or the rewards to the students who do best the tasks and to direct the students' bad behaviors.

Two types of English tense are used. The Biology teachers use the past and the non-past tense (the simple present and the future tenses) across the three contexts of the instruction in the various language functions. The non-past tense is used to refer to events that are not in the past tense. Apart from sentence patterns and tense, the findings provide evidences that three Biology teachers use simple and complex sentences to do the instructions. The simple sentences are dominantly used when they express a single idea in a sentence. The complex sentences are used when the idea is not possible stated in a simple sentence.

The observations of teaching practices record also the ability of three Biology teachers are competent in using English that is appropriate to its functions. English they use serve language functions in the domains of social (Basic Interpersonal Communication Skills/ BICS) and academic functions (Cognitive Academic Language Proficiency/CALP). In the domain of social

functions, English is used for interpersonal conversations such as greetings, leave-takings, appreciating the students' works, showing inconveniences and others.

In the domain of academic functions, three Biology teachers use English for the explanations, the descriptions, the comparisons, the assessments, and the clarifications and paraphrasing. These functions are used within the application of instruction, the science instruction and the vocabulary instruction. In the context of application of instruction, the Biology teachers use the explanations and descriptions to direct the students do the tasks. In the context of science instruction and vocabulary instruction, the Biology teachers use the six integrated language functions. The explanation is used to indicate the scientific relationships, guide the students' understanding of the scientific concepts and give the reasons for the scientific theories and the experiments. The explanation is also used to give the scientific reasons for theories and experiments. The description is used to provide the students background knowledge of the scientific concept. The description is done by relating a real world and a science. The language function of comparison is used to compare a new scientific theory, concept, or fact to another theory, concept, or fact that is understood by the students and the similarities and differences among two or more scientific theories, concepts, or facts. The language function of clarification is used to repair misunderstanding of scientific concepts.

5.2 Suggestions

Having reviewed, synthesized the theoretical framework underlying the focus of my research, the result of data interpretation, then compared my research

findings to the studies by former researchers, the researcher is of the opinion that this work probably raises the science teacher's awareness of the significance of using English as a medium of instruction to the students whose mother tongue is not English like in Indonesia. Using English as a medium of instruction gives linguistic and academic advantages. Linguistically, the findings of this research reveal the knowledge of linguistic aspects such as the vocabulary, grammar and language function are exposed to the students while they are learning Science-Biology. These three language aspects probably convey a valuable contribution to the students' English mastery. The language inputs are expected to be modalities to develop the students' communicative skills. And the ways how the Biology teachers use English become one learning source for the students.

The researcher assumes, by the time, the students will get into a good habit of listening, reading, writing, and speaking English if they are often drilled to hear and to use the words and the sentences. The regular use of English gradually and naturally leads the students to the position of the working English proficiency level useful for both the academic life and the workplace although it will take few years to establish. Under the view of this conceptual framework of language acquisition, the habit of practicing English in active and passive English skills is viewed as a generator to energize the students' motivation to improve their English.

Academically, the offering content materials can widen the students' horizon about events, facts, phenomena that are very close to the students' life. They can learn a lot about the natural process, system, product in plants, animals,

and other living and on-living things and other. In addition, the use of English develops the student's critical thinking. The critical thinking refers to the students' capability to argue, compare, contrast, synthesize, approve, draw conclusion, and other. A language transmits "message" from sender to the receiver (Fromkin, 2000). In the case of my study, the senders are the Biology teachers, the receivers are the students, and the message is content offered to the students. When the Biology teachers are using English in a certain instruction the students are in the position to catch the message. The process of inferring the transmitted message by providing the question words why, what, how, and which stimulates the students' critical thinking develop automatically.

For the science teachers' interest and the Department of Education and Culture, the findings of this research remind of a firm demand for mastering communicative competence. The possession of linguistics competence (vocabulary and grammar) and the ability to use language for a certain purpose is forcefully demanded. The science teachers can freely conduct the instructions if they have working English proficiency needed by the instructional purposes. The three contexts of instructions (application instruction, science instruction, or vocabulary instruction) will be done well if the science teachers have sufficient vocabulary, grammar and ability to use English syntactically and semantically true.

Referring to the linguistic and academic benefits of using English as a medium of instruction as mentioned in the overall discussion (Chapter IV), support from the government and people participation are fully needed by Science

teachers of *RSBI* to run the job well. Theoretically, acquiring English through the model of partly immersion, English across curriculum, or bilingual program takes around 7 to 8 years (Cummin1999). In this view, it is too early if people claim the use of English as an instructional language in *SMP RSBI* is just wasteful (*Jawa Pos*, 22 February 2009, *Jawa Pos*, 4 January 2012). The program has just started for last three-four years so the result is not opened up yet. The findings of questionnaire survey tell that the majority of respondents (54.02% of the total respondent) have strong motivation to use English because English is globally spoken or written by the people of world for social, economical, political needs. 49.49% of the respondents have belief in the significance of the use of English to teach science (see Appendix 7).

The interviews with informants find the use of English as an instructional language do not make the students' academic achievement get worse as it is seen in the student evaluation documents (see Appendix 11, Extract 2). Anyhow, it is undeniable that many science teachers still face language barriers (Appendix 11 Extract 6). The previous studies report that the intensity of the use of English in science classes is less and the Indonesian language is frequently used (Prajarisma, 2009). A study that is conducted by Rachmajanti, Sulistyo, and Widiati (2008) also reveal that the science Biology teacher's English proficiency average is less than 400. The findings of questionnaire survey (see the appendix 7) reveals there are only 8% of the total respondents are competent in using English to teach. In addition the interview with sample of informants (see Appendix 12), it is found that many Biology teachers have difficulties: (1) to use new science terminology

or word correctly, (2) to explain concepts in English, (3) to respond the students in English, (4) to write report in English, (5) to lead class discussion, and (6) to provide examples in English.

Due to such existing problems, the recommendation offered to encounter these existing language barriers can be proposed as follow: optimizing the teaching training, the language trainings, encouraging the science teachers to self-direct their professional, giving motivation (a financial incentive may be given to science teachers to motivate them to teach), providing more teaching materials, providing language support (promote the science teachers to learn grammar, vocabulary from English colleague, and collaborate with them).

The work reported in this study is a descriptive study of feature of English (the vocabulary and grammar) and functional English used by the Biology teachers to teach Science-Biology to the year 7 students of *SMP RSBI.* Due to time limitedness of the study and offering teaching materials, the researcher is quite aware that the result might not be a conclusive recommendation in this time, even be far from perfect although the effort is exploratory. Therefore, the researcher expects the future ideal analyses of English used as a medium of instruction can be expanded to the following points:

- It is possible that the additional communicative intents and the linguistic features (discourse, syntax, and vocabulary, and language function) necessary to expand relevant with the instructional intents.
- The analyses of additional instructional/learning contexts that focus on the teaching and acquisition of both the English discourse and sentence level

aspects of academic language can be expanded to complement the existing findings of this research. These two aspects are essential elements of academic language (language used in context of the teaching and learning) because they are used in the content area of any disciplines. Thus they must be explained.

) Refinements of the component analyses are possible to complete. They should not only include the observations on the structural features of language and the language function as seen in this existing report .This study only focuses on the uses of English by the Biology teachers primarily at limited functional level of English and its structural features.

This study shares the knowledge of how to conduct an effective communicative in teaching and introducing the vocabulary, the grammar and the language functions in the science classes. One Biology teachers (T23) is observed using multiple language functions to make the students understand the concepts she delivers and then finally assessing the students' understanding. The example described below shows how a Biology teacher might moves through one language functions to another function to teach a science concept. To teach students about the process of photosynthesis, the Biology teacher found explaining the plants take light from the sun and turn that energy into food that helps them to grow. To ensure the students understand the new concept, the Biology teacher, then, describes how a plant dies without sunlight.

Next step, the Biology teacher uses comparison to describe why so few plants grow in caves while many plants grow in sunny gardens. Soon after she imparts the knowledge, she assesses the students by raising a question in order to

ensure that students understand the scientific concept being taught. In this example, the language functions of explanation, description, comparison, and assessment (integrated language functions) are used to teach the process of photosynthesis. Perhaps, the Biology teachers who are able to organize the use of language in this manner can be more effective in teaching content area material than those who do not. Aside from the academic benefits, it is quite possible that the students' English acquisition get progress if the English exposure runs as the steps taken by the three Biology teachers. Hence, this issue needs a further empirical study.

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