MATHEMATICS AND SCIENCE TEACHERS' PERCEPTIONS AND COMMUNICATION STRATEGIES ON THE USE OF ENGLISH AS A MEDIUM OF INSTRUCTION AT SMP NEGERI 1 DENPASAR

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Abstract

This study aimed at investigating the use of English as a medium of instruction (EMI) at Pre-International Standard School (RSBI) at SMP N 1 Denpasar. It includes the mathematics and science teachers' perception, the frequency of the use of English, and the communication strategies used by mathematics and science teachers. The subjects of the study were mathematics and science teachers at SMP N 1 Denpasar of grade eight. Semi-structured interview and close questionnaire were applied to gather the data of mathematics and science teachers' perception. The frequency of English and communication strategies used by the mathematics and science teachers were gathered by recording the instructional process. The findings of the study show that the mathematics and biology teachers had a good perception, but physics teacher had average perception toward the use of English as a medium of instruction. However, the proportion of English used as a medium of instruction at SMP N 1 Denpasar has not fulfilled the basic requirement of Pre-International Standard School (RSBI). Even, in its sixth year of the program implementation, the science teachers have not implemented 100% the bilingual teaching and learning process. The average percentage of English used by the Mathematics, Biology, and Physics teachers is 84.50 %, 13.72%, and 0% respectively. The data analysis also revealed that there were five types of communication strategy applied by the mathematics and science teachers, namely: language switching, pausing, use of non linguistic resources, clarification check, and comprehension check.

Key words: bilingual class, *teachers' perception, English frequency, communication strategies*

INTRODUCTION

In planning, conducting, and assessing or evaluating an education, "Adaptation" is an important aspect to be considered. Adaptation means adjustment among education planning, conduction, and the social factors where the education plan is conducted. Universally, education must focus on the preparation of facing the globalization era. According to Codd, Olssen, and O'Neill (2004) globalization is not a new phenomenon but it becomes more complex and spreads more widely with the entry of sophisticated technologies as well as the expansion of global markets.

In this globalization era, many people are forced to face many rapid changes in every single piece of life. Therefore, a good qualification is needed in order to take an appropriate action in facing those changes. But, the most important means to be well qualified in facing the changes is education quality. To improve the education quality, Indonesia government has done many educational policies. The innovative policy in education recently published by the government is

Rintisan Sekolah Bertaraf Internasional (Pre International Standard School).

The realization of International Standard School is based on Law Number 20 year 2003, on national education system, article 50 paragraph (3) which states that central and/or district government are suggested to organize at least a unit of education in every level of education and it should be developed as an international standard education level. In addition, the government regulation number 19 year 2005, the National Standard of Education, also firmly mentions the necessity of International Standard School. The government regulation number 19 year 2005, article 61, paragraph (1) states that government and district government carry out a unit of education on elementary level and at least a unit of education on the secondary level of education to be developed into an International Standard of Education.

Pre International Standard School (RSBI) is expected to improve the quality of national education to enhance the competitiveness among other developed countries. RSBI attempts to use the instruction implemented in developed countries, trying to accommodate the students' potential to achieve the targeted standard competency in ordinary schools. In a developed country, potential and talented students are categorized into exclusive class called GATS (Gifted and Talented Students). These students are given educational process aiming at achieving the international standard in addition to the national curriculum.

There are a number of characteristics of *Rintisan Sekolah Bertaraf Internasional* (RSBI), which is related to the improvement of quality either inputs or output. The strategy is related to the improvement of the quality of input such as: the implementation of the strategy in order that the input can maintain an adequate international standard of education, either good selection of row inputs or the preparation of instrumental input which is internationally standardize. A number of strategies directed to the improvement of the quality of output are: (1) maintaining the quality of graduates on the national curriculum, (2) graduate competency in English, and (3) having the acknowledgment of graduation by abroad education. Meanwhile, a number of primary strategies related to process of aspect, such as: (1) improving the quality of education especially for math and sciences, (2) using English as a medium of instruction (EMI) in teaching and learning process.

English as a Medium of Instruction (EMI) is a recently developed bilingual teaching method. The main idea of EMI is to combine the conventional instruction of content area subjects with foreign language learning. Instead of the mother tongue, a foreign language is used as a 'tool' for communication in different subjects. In RSBI, primarily, the demand of using English as a medium of instruction (EMI) must be fulfilled by mathematics and science teachers. The teachers are expected to master English since the government regulation affirms that in RSBI the science instruction, in this case including mathematics, physics, chemistry, and biology must be bilingual.

In line with the previous explanation, the most important component in implementing RSBI is the preparation of the teacher as a resource (educator). Teachers have a strategic role in improving the quality of education and even other adequate educational resources are often less meaningful when it is not supported by the presence of qualified teachers. RSBI organization will run as a standard that has been set if the school is able to prepare good teachers. In other words, the teacher is spearheading to improve the quality and educational outcomes.

Related to the role of the teacher, the organization will be able to run as the standard of RSBI established if the school is able to prepare a good teacher. To realize the conditions, it is necessary to have a good management that can be implemented effectively. The quality of the teacher is the single greatest determinant of students' achievement. Teacher's education, ability, and experience account for more variation in students'

achievement than all other factors (Smith, 2007). Teachers in RSBI are designed to become figures who understand well the meaning of learning concepts such as higher-order thinking skill and contextual learning and know well the different characteristics of his/her students (Fahriza, 2010 in Purnomo) In short, the teacher is a key element in improving the quality of education.

In the implementation of the teacher as a key element, the teacher does not only use the knowledge to teach the students but also uses their perception. Perception is defined as a process of combining between sense and interpretation (Walgito, 2002). The perception in this study is related to mathematics and science teachers' perception on the use of English as a medium of instruction. The teachers who have a good perception on the use of English as a medium of instruction tend to have a good tendency to the application of English. This perception can be related to the frequency of English used by mathematics and science teachers.

However, based on the researcher's observation done at SMP Negeri 1 Denpasar which has been labeled as RSBI since 2007, it was found that the mathematics and science teachers only attended scientific forums in learning English for science to enrich their ability to improve their English and most of them graduated from the university in which the teaching and learning process used *bahasa Indonesia*. Therefore, they did not have the opportunity to learn English intensively so that they could not use English to communicate appropriately. This may cause a problem in understanding mathematics and science concept. On one hand, the students must learn science and mathematics content while they are still learning English (McKeon, 1994 and Slavit & Ernst-Slavit, 2007) and on the other hand, the teachers have proficiency problems with the new medium of instruction. These teachers who are not language specialists will have to cope with the double demands of transmitting content as well as language (Pandian & Ramiah, 2009). In other side,

this sudden change to the current science and mathematics medium of instruction may also cause culture shock to the teachers (Aziz, 2005).

Even though the teachers have studied English for several years when they were at school, most of them are not able to use English as a tool of communication. So, they might be having problems to cover their subject area in an accurate and effective manner and the students might have some difficulties in understanding and acquiring the subject. And there might also be an anxiety of a tendency that the science and mathematics teachers will show off their ability in mastering English so that the teachers will not focus on explaining the materials but they might be more focus on the use of language or their ability of English.

Regarding the problems encountered, this study is then focused on describing the use of English as a medium of instruction at SMP Negeri 1 Denpasar. It included how the mathematics and science teachers perceive English as a medium of instruction. In order to conduct a holistic study that provides a detailed perception of the teachers. It is thought to be important to know the mathematics and science teachers frequency of the use of English. Meanwhile, during the teaching and learning process, it was also found certain types of communication strategy used by the mathematics and science teachers in delivering the material using English as a medium of instruction. It is very essential to know the real condition, problems and challenges that occurred from the policy applied to get clearer picture on what had happened in the school. Besides, this study is necessary regarding the possibilities to formulate some recommendations for the policy maker based on the gained result concerning the mathematics and science teachers' perception, the frequency of the teachers' use of English as the medium of instruction, and the communication strategies used by mathematics and science teachers in the science class on *RSBI.*

The use of English as a medium of instruction is associated to (1) mathematics and science teachers' perception on the use of English as the medium of instruction, (2) the frequency of the teachers' use of English as the medium of instruction, (3) and the communication strategies used by mathematics and science teachers outlined in the introduction. In relation to the use of English as a medium of instruction as stated above, the research questions of the study are formulated as follows:

1. What are the mathematics and science teachers' perceptions on the use of English as the medium of instruction in the science classes at SMP Negeri 1 Denpasar?
- What are the mathematics and science teachers' efforts to improve their use of English as a medium of instruction?
- What is the frequency of mathematics and science teachers' use of English as the medium of instruction in the science classes at SMP Negeri 1 Denpasar?
2. What are the types of communication strategies used by mathematics and science teachers in the science class at SMP Negeri 1 Denpasar?

METHOD

A mixed methods research design was used to conduct this study. A mixed methods research design is a procedure for collecting, analyzing, and "mixing" both quantitative and qualitative methods in a single study or a series of studies to understand a research problem (Creswell & Plano Clark, 2011). The basic assumption is that the uses of both quantitative and qualitative methods, in combination, provide a better understanding of the research problem and question than either method by itself. Craswell (2009) also defines several reasons for using a mixed methods design to conduct a study. The first, conducting a mixed methods study when having both quantitative and qualitative data and both types of data, together, provide a better understanding of the research problem than either type by itself. The second,

mixed methods research is a good design to build on the strengths of both quantitative and qualitative data. Quantitative data, such as scores on instruments, yield specific numbers that can be statistically analyzed, and can produce results to assess the frequency. However, qualitative data, such as open-ended interviews that provide actual words of people in the study, offer many different perspectives on the study topic and provide a complex picture of the situation.

Quantitative approach in this study was used to find out the percentage of the frequency of English use as a medium of instruction in science class, the mathematics and science teachers' perceptions toward the use of English as a medium of instruction, and to find out the percentage types of the communication strategy used by mathematics and sciences' teachers during the classroom activity in math and science class. Qualitative approach was used to find out the types of communication strategy used by mathematics and science teachers.

There were a number of data collections used by the researcher to collect the accurate data. Classroom observation technique was used to collect the data that were related to human being behavior, working process, and natural signs (Sugiyono, 2006). Observation is a primary source of data in qualitative research (Merriam, 1998). This research needed observation as supporting data to see whether English was used in science and math class as an instrument of communication. This technique answered the second research question and it also reflected the honesty of the teachers in answering the first research question.

The second method was recording the data by using recorder (digital camera). The data obtained was from the teachers and students when they had bilingual class.

After collecting questionnaire data toward the mathematics and science teachers' perception, another method of data collection, interview was used. According to Cannell and Khan (1968) cited in Cohen and Manion (1994) research interview is a two person

conversation to obtain research-relevant information and focus on content specified by research objectives and research questions.

This semi structured and open ended interview were applied in answering the first and third research questions. The questions were about: teachers' opinion of English, the effectiveness of using English as a medium of instruction in math and science class, the frequency of using English by the teachers, the feeling of being bilingual class, the important of using English as a medium of instruction.

In qualitative research, the data taken could be subjective. To get valid and reliable data, after collecting and analyzing the data, there should be another step to be taken that is triangulation. Triangulation is broadly defined as synthesis and integration of data from multiple sources through collection, examination, comparison, and interpretation (Gillman, 2007). Triangulation has been applied in diverse fields of social science to strengthen conclusions about observations and to reduce the risk of false interpretations by drawing upon multiple independent sources of information.

FINDINGS AND DISCUSSION

This section gives a clear description of the findings of this study by bringing the major findings from the individual teacher. The section begins with teachers' perception on the use of English as a medium of instruction, the frequency of the use of English, and types of communication strategy used by mathematics and science teachers.

The Mathematics and Science Teachers' Perception toward the use of English as the medium of Instruction

To answer the first research question, Likert Scale was used to find out the mathematics and science teachers' perception toward the use of English as a medium of instruction.

Based on the result of analysis, it revealed that the result of the score of the Teacher 1's perception was 2.933; where the Sr was $2.085 \le 2.933 < 2.915$, it indicated that the Teacher 1 had a good

perception toward the use of English as a medium of instruction implemented at SMP Negeri 1 Denpasar.

Based on the finding of the study, Teacher 1 had a good perception on the use of English as a medium of instruction. This perception was supported by the statements answered by the Teacher 1. Teacher 1 stated firmly that the teacher could teach science using two languages. Based on the researcher's interview, the teacher tried to improve English skill by participating in scientific forums, such as: learning general English, basic English for science, attending workshop *pembelajaran Matematika dan Pengetahuan alam, bimbingan teknis pembelajaran bagi SBI, seminar nasional pengembangan pembelajaran, seminar guru rintisan bertaraf internasional* (RSBI), *workshop penguatan dan pemantapan pengelolaan RSBI*, and international competition and assessment for schools mathematics.

Teacher 1 also thought that the communication between the teacher and students run smoothly. Based on the interview, the teacher tried to use information and technology for self development, such as: using LCD or wall screen, using LCD projector, internet access, and using teaching aids. The questionnaire also revealed that the Teacher 1 did not feel ashamed to speak English to others it is due to the teacher had a sufficient competence to teach science using to languages. The Teacher 1 also tried to conduct the research to improve English skill. The research that was being conducted by the teacher was "*Pengaruh Model Pembelajaran Problem Posing Berbasis Open Ended dan Orientasi Tujuan Terhadap Prestasi Belajar Matematika Siswa SMP Negeri 1 Denpasar*".

From the result of analysis, it showed that the result of the score of the Teacher 2's perception was 2.922; where the Sr was $2.085 \le 2.922 < 2.915$, it indicates that the Teacher 2 also had a good perception toward the use of English as a medium of instruction implemented at SMP Negeri 1 Denpasar.

Teacher 2 also thought that the teacher explanation was clear to the

students. A number of efforts have been done by the Teacher 2 to improve English skill in such a way the teacher could teach science using English, such as: reading some books, article, journal about science and education. A number of books and articles that were read by the teacher, such as: living organism, introduction to science, using instruments and techniques in science, biology book first edition, ecosystem, Biotic and A biotic components, interaction among individual in an ecosystem, energy flow in Tropic, energy, wild plants, counting index of diversity, human population destiny and its effect, environment danger because of human activity, measurements and Physical Quantities, mercury in glass thermometer, thermal expansion.

The questionnaire also revealed that the Teacher 2 did not find any significant problems in teaching science using two languages and the teacher also thought that science subject using two languages was interesting thing to be implemented. Based on the interview, the teacher tried to use various techniques and models in teaching and learning process. A number of techniques and teaching models had been implemented in the teaching and learning process like Problem solving, lecture-Based, Cooperative, Experiment, Contextual Teaching and Learning, Pair Work, Group Work, Communicative Approach, and Living Value Communicative Approach.

The result of analysis revealed that the score of the Teacher 3's perception was 2.84; where the Sr was $2.085 \leq 2,84 < 2.915$, it means that the Teacher 3 had average perception toward the use of English as a medium of instruction implemented at SMP Negeri 1 Denpasar.

Based on the data analysis, Teacher 3 had average perception on the use of English as a medium of instruction. The teacher thought that teaching science using English was not so good or bad. The questionnaire revealed that the Teacher 3 thought that teaching science using English was an interesting thing. Thus, the teacher was able to teach science using two languages. To improve the teacher's English skill in teaching math

using English, the Teacher 3 tried to attend some scientific forums, such as: *Peningkatan Kemampuan Pembina* SLU/Improvement of Science and Mathematics Teaching in the Secondary School, *Pelatihan Guru Melalui Sanggar Pemantapan Kerja Guru (SPKG) IPA SMP/SMA, Workshop Pembelajaran Matematika dan Pengetahuan Alam Dalam Berbahasa Inggris* (Bilingual)*, and Pelatihan Keterlaksanaan Kurikulum 2004 Bagi Sekolah Standar nasional (SSN).*

However, the Teacher 3 thought that the teacher's explanation was less clear to the students. The Teacher 3 also found some difficulties in explaining the material using English. Even though the science teacher's explanation was less clear, but the teacher could maintain the communication to the students effectively. Furthermore, the students were capable to respond the teacher' explanations and instructions when teaching and learning process. Even thought the Teacher 3 thought the teacher explanation was less clear, the teacher also tried to read some books, articles, and journal about science and education. The teacher also conduct the research entitle "'*Sejauh Manakah Pembuatan Tugas Meringkas Dan Peta Konsep Dalam Pembelajaran Fisika Dalam Meningkatkan Motivasi Dan Prestasi Belajar Siswa Kela VII A SMP Negeri 1 Denpasar*'. After doing the research, the teacher was able to apply new things related to teaching in the classroom. Doing research has improved the teachers' knowledge and skills in teaching and dealing with various students with various characteristics.

The questionnaire also revealed that the Teacher 3 did not feel ashamed to speak English to others it is due to the teacher had a sufficient competence to teach science using two languages. However, the Teacher 3 preferred to use *bahasa Indonesia* instead of using English when teaching science.

The Frequency of English Use as a Medium of Instruction Used by Mathematics and Science Teachers

Since bilingual education is implemented in the teaching and learning

process in science classes of *RSBI,* the frequency of the use of foreign language, particularly English become prominent features in a bilingual classroom.

The frequency of both teachers and students use of English will finally affect on one of expected profiles of development phase in *RSBI*; that is the percentage of bilingual teaching and learning process.

The table below gives a clear description of the percentage of the utterances employed by mathematics and science teachers.

Table 4.1 Percentage of the Utterances Employed by Mathematics and Science Teachers

No.	Teacher	Percentage of English Utterance	Percentage of utterances in *Bahasa Indonesia*	Percentage of language switching	Total
1.	Mathematics	84.50 %	9.85 %	5.63 %	100%
2.	Biology	13.72 %	62.74 %	23.52%	100%
3.	Physics	0 %	98.07 %	1.92 %	100%

From the table above, it can be seen clearly that the mathematics teacher employed a high frequency of English as the medium of instruction in the classroom or 84.50 % of English utterances used, which only 4 utterances of language switching or 5.63 %, and 7 utterances in *Bahasa Indonesia* or only 9.85 % from the total utterances employed by mathematics teacher.

Based on the interview with the subject (the teacher), besides the school policy about the emphasizing on written English, she always applied spoken English in much higher frequency in bilingual class. This was also proved by the observation during the class that the subject did not use any references in written form to help the teacher to give instruction in English. To improve English skill, the teacher attended some scientific forums to enhance the use of English especially in science class. Based on the observation conducted in the classroom, the communications performed by mathematics teacher and the students run smoothly. The students seemed did not find any problems during the teaching and learning process when the teacher employed such a high frequency of the use of English in the teaching and learning process.

Based on the basic requirement of RSBI, Hariyanto (2009) states during the first year or development phase of *RSBI* program, it is expected that 20 % of the teaching and learning process has employed bilingual education. In the next second year this percentage must reach 50 %, and ideally this percentage will be increasing reaches the ideal proportion of 100 % in the third year. Referring to Hariyanto's statement, mathematics teacher at SMP Negeri 1 Denpasar had fulfilled the basic requirement of Pre-International Standard School (RSBI) regarding in the six years of the implementation of *RSBI*, the mathematics teacher had implemented 84.50 % of the use of English in teaching and learning process.

From the result of the data analysis revealed that biology teacher of SMP Negeri 1 Denpasar used *Bahasa* Indonesia as the prominent of the language instruction. The researcher also noted that there were 24 utterances in language switching used by biology teacher in his speech. The table above clearly displayed that English used by the biology teacher during his speech in teaching process was 13.72 % or only 14 utterances in English during the whole speech of learning and teaching process. It can be said that the frequency of the use of English used by biology teacher was considerably very low. The utterances were dominated by the use of *Bahasa Indonesia*, it was shown with 64

utterances were used by biology teacher or 62.74 %. Another fact revealed that 24 utterances of the language switching were produced by biology teacher or 23.52%. In other words, the language instruction was obviously dominated by the use of *Bahasa Indonesia* and it became the language choice for the biology teacher as the language instruction.

Based on the data analysis, biology teacher did not implement bilingual effectively since the fact showed that the use of *bahasa Indonesia* was still dominated in teaching and learning process. Considering that the RSBI is officially formed in 2007, the teacher was expected to use bilingual (*bahasa Indonesia* and English) effectively. In other words, the biology teacher has not fulfilled the basic requirement of RSBI regarding SMP N 1 Denpasar in its sixth year of the program implementation has not applied 100% of bilingual in teaching and learning process.

Based on the data analysis, the physics teacher had not implemented bilingual education in delivering the subject. It could be shown by the presence of the use of *Bahasa Indonesia* in delivering the subject. The utterances of *bahasa Indonesia* produced were 102 utterances or 98.07 %, the physics teacher did not use English or 0% during the lesson. The teacher only produced 2 utterances or 1.92 % of the language switching. From the data analysis, it was found that *Bahasa Indonesia* was the most frequent language used by the physics teacher. It can be said that the frequency of the use of English by physics teacher was very low.

Referring to the main characteristic of RSBI, after the third year of the implementation of RSBI the teachers are expected to reach 100% bilingual when teaching and learning process. It indicates that physics teacher has not fulfilled the basic requirement of RSBI regarding the physics teacher in its sixth year of the program implementation has not applied 100% of bilingual in teaching and learning process.

Types of Communication Strategy Used by Mathematics and Science Teachers at SMP Negeri 1 Denpasar

The result of the recording and observation showed that the mathematics and science teachers of SMP Negeri 1 Denpasar used some types of communication strategy to maintain the teaching and learning process run effectively and smoothly. In order to describe the types of communication strategy used by mathematics and science teachers, the researcher used two Communication Strategies proposed by Littlewoood (1984) and Tarone (1980); Bialystok (1990); and Dorney (1995).

The data for this problem was based on the classroom observation elaborated with the transcribed utterances of language of instruction used by mathematics and science teachers in science classes at SMP Negeri 1 Denpasar during the teaching and learning process. The researcher then noted each utterance on the transcription whether it had any communication strategy or not.

From the transcriptions of all mathematics and science teachers' utterances, it was obtained that there were five types of communication strategy employed by mathematics and science teachers, namely: language switching, pausing, use of non linguistics resource, clarification check, and comprehension check.

The Communication Strategies Applied by Mathematics Teacher in Science class at SMP Negeri 1 Denpasar

Mathematics teacher used communication strategies to maintain the communication with the students in order to run smoothly and effectively. There were three types of communication strategy used by mathematics teacher, namely: language switching, pausing, and clarification check. Language switching was produced 3 times, pausing 4 times, and clarification check 1 time when the teaching process.

Based on the interview done, language switching was used by the mathematics teacher when the teacher did not know how to say the words or phrases

in English then the teacher decided to simply lift the words from their own language, in which they just simply pick up the words from *Bahasa Indonesia*. Besides, the teacher also used language switching in order the students got the point of what has been explained by the teacher.

It was also found that the mathematics teacher often used pause fillers like: "emm...", the mathematics teacher used the filler in order to have some time to think what to say next. This type of communication strategy was very effective used by the teacher to maintain the communication to use English effectively.

Mathematics teacher also applied clarification check. The clarification check is a request made for repetition or explanation, such as saying: "What do you mean?", "Again?", "Please", "Pardon". Based on the transcription of the recording, it showed that mathematics teacher only used 1 utterance of clarification check.

Based on the researcher's interview, this type of communication strategy (clarification check) was used by the mathematics teacher to make repetition to the student's explanation and also to confirm the intent of the students.

Types of Communication Strategy Used by Biology Teacher at SMP Negeri 1 Denpasar

Biology teacher also tried to employ some types of communication strategy to maintain the communication in order to run effectively. There were a number of types of communication strategy used by biology teacher, namely: language switching, pausing, use of non linguistic resource, and comprehension check.

From total 26 communication strategies, 25.49% (18 utterances) was in the form of language switching, 4.76% (1 utterance) was in form of pausing, 23.07% (6 utterances) was use of non linguistics resources, and 4.76% (1 utterance) was in form of comprehension check. None of the communication strategies were in form of the use of clarification check.

Based on the interview, the biology teacher employed language switching due to the students could not respond on the teacher's explanation. The biology teacher tended to switch the language in order the student really understood the concept of the subject taught. The biology teacher also said that only a few students who were able to use English, and most of them could not speak English properly that was why the language switching was needed in order the students got the a clear explanation.

During the observation and recording process, it was found that teachers used pause fillers like "Ya....", Based on the interview, the use of pausing used by biology teacher was beyond the teacher's awareness; it happened spontaneously at the time of the teacher speech.

The use of non linguistics resources also could be found during the teaching process conducted by biology teacher in science class. Facial expressions, gestures like pointing and showing, nodding, and head shaking were often employed by the teacher. These strategies could make the meaning, message, instruction or explanation from the teacher toward the students become clearer. Actually, the use of the communication strategy was beyond the teacher's awareness; it happened spontaneously at the time of the teacher speech.

Types of Communication Strategy Used by Physics Teacher at SMP Negeri 1 Denpasar

The condition of the communication strategies applied by the Physics teacher was completely different from the previous case of mathematics teacher. Since the speech was dominated by the use of *Bahasa indonesia*, the types of communication strategy that were usually found along with the employment of English utterance could not be found in science class taught by physics teacher.

There was only one type of communication strategy used by physics teacher, namely: language switching. The language switching was employed 2 times by the physics teacher.

CONCLUSION AND SUGGESTION

From the findings and discussion which have been presented in the previous chapter, it can be concluded that the mathematics and science teachers had a different perception on the use of English as a medium of instruction. Some teachers had a good perception on the use of English as a medium of instruction, the other teacher had average perception on the use of English as a medium of instruction.

Even though some teachers had a good perception, their frequencies of English were still very low. The data revealed that 84.50% of English utterance used by mathematics teacher, biology teacher produced 13.72% of English utterance, and physics employed 0% of English utterance. According to Haryanto (2009) the first three year or development phase of *RSBI* program, it is expected that in the first year 20 % of the teaching and learning process has employed bilingual education. In the next second year this percentage must reach 50 %, and ideally this percentage will reach the ideal proportion of 100 % in the third year. In order words, the mathematics teacher has fulfilled the basic requirement of Pre-international standard school. Yet, the biology and physics teachers have not fulfilled the basic requirement of Pre-International Standard School.

The mathematics and science teachers also used some types of communication strategy to maintain the science class in order to run smoothly and effectively. There were five types of communication strategy used by mathematics and science teacher out of 14 types of communication strategy proposed. The types of communication strategy used by the teachers were: language switching, pausing, use of non linguistic resources, clarification check, and comprehensions check.

After gaining some results from the study toward teachers' perception and the frequency of the use of English in science class, there were some suggestions that could be given to the teachers, the school, and the policy maker. For the teacher, mathematics and science teachers in Pre-International Standard School should be aware of the effective teacher classroom instruction especially on the use of English as a medium of instruction. It is also suggested to mathematics and science teachers could improve their skill in teaching math and science using English as a medium of instruction. For the school, the school and stakeholder are suggested to provide more opportunities to enrich the teachers' insight to support them in developing the quality of the education. And for the Indonesian government as the policy maker should not only decide the policy of for the implementation of *RSBI*, but also need to examine the readiness of the teachers in using English as a medium of instruction.

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