

USE OF ENGLISH IN TEACHING MATHEMATICS

By
Muthia Kumala Dewi*
Bustami Usman
Asnawi Muslem

Syiah Kuala University, Banda Aceh

ABSTRACT

This is a descriptive qualitative study designed with the aim of investigating the teacher's use of EFL English in teaching Mathematics at Fatih Bilingual School in Banda Aceh in terms of opening, main, and closing activities. This study also investigated the obstacles encountered by the teacher in teaching Mathematics using EFL English and her efforts to overcome those obstacles. The subject of this study was a female Mathematics teacher who has been teaching tenth grade Mathematics. The research subject was chosen by using a purposive sampling technique. The data were collected through three periods of classroom observations and an in-depth interview with the teacher. The data collected was analyzed qualitatively. This study revealed that the processes of teaching Mathematics in Fatih Bilingual School involved translation. The use of English and Bahasa Indonesia were not equivalent when English became dominant. For the concepts of Mathematics, the teacher explained them in both languages. The main obstacle the teacher faced was difficulty with terminology which she had to deal with first and then had to make her students understand it too. The results also indicated that the teacher had made efforts to make the hard topics simpler so that the students could get the concepts when the teacher explained them using English. The solution for those problems was that the teacher used tools of mathematics, pictures, graphs and/or video. Code switching was also an alternative used to help the bilingual activities. In conclusion, the use of EFL English in teaching Mathematics can be done with bilingual classes. The portions of English and of the mother tongue used in the teaching activities may not be the same.

* Corresponding author: muthiakumala@gmail.com

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INTRODUCTION

English has been a number one tool of communication starting from a few centuries ago until nowadays. As we can see, the number of people using English as their second and third language is still on the rise because people are using it for widespread connectivity. From the aspect of Education, EFL English plays an important role for the success of learning as it is an important subject at school. In fact, mastering English especially for speaking purposes has become a primary goal for many parents for their children. This encourages parents in Aceh to send their children to schools that teach subjects bilingually.

Bilingual education has become more prestigious recently with an increasing number of bilingual educational institutions in Indonesia. The implementation of bilingual education in Indonesia revived in 2004, after the fall of the *New Order* government and has gained in popularity, especially over the next eight years with over 1300 schools categorized as international standard schools in 2012 (Margana, 2013). Bilingual education refers to “the use of a second or foreign language in school for the teaching of content subjects” (Dale & Cuevas, 2002), such as Mathematics and Science.

Mathematics is one of the challenging subjects for ESL learners. The mathematical concepts expressed in words often sound different from the concepts expressed in symbols. In fact, Mathematics and language are intricately connected; language facilitates Mathematical thinking (Carbine, 2013). Language use in a bilingual classroom is a reflection of the language proficiency of the teacher. Anne (2009) has said that bilingual or multilingual instruction in education requires well-defined concepts along with people involved in the processes of teaching-learning that can adapt the use of the languages to the situation and the requirements.

Bilingual education in Aceh has developed rapidly. The researcher has spent the last two years of her career teaching Mathematics in a bilingual school. During the teaching-learning processes, both English and Bahasa Indonesia were used and the researcher tried to find solutions to the problem of how to best use the two languages in the classroom. If the researcher was not monitoring the language use,

English was used almost exclusively by those students who have excellent English proficiency whilst Bahasa Indonesia was used almost all the time for those children who did not understand English well. In general, the curriculum applied in Teuku Nyak Arif Fatih Bilingual School refers to the National Curriculum. In its implementation, the curriculum is enriched with a curriculum developed by the School itself oriented to an International Curriculum. Teuku Nyak Arif Fatih Bilingual School's curriculum structure has been created based on the special characteristics of the school, as one of the Co-operation Education Unit (CEU) schools, which refers to the bilingual system (*SPK SMA Teuku Nyak Arif Fatih Bilingual School*, 2017).

One study found that effective teachers use whatever language is necessary to ensure that all the students understand the lesson. Vazquez (2002) reported an observation that was made about 58 teachers who had been appointed by their colleagues and their administrators as good bilingual teachers. One of the things that these effective teachers did was to mediate instruction to ensure that students with limited English proficiency had access to it. They did this by codeswitching, using the native language whenever needed to achieve clarity of understanding. In this study, the researcher investigated the use of the two languages in terms of opening the lessons, the main activities and finally closing the lessons. The researcher also described the obstacles that the teacher encountered in teaching Mathematics by using English and the ways the teacher used to deal with them.

Research Questions

1. To what extent does the teacher use EFL English in teaching Mathematics at Fatih Bilingual School Banda Aceh in terms of opening, main and closing activities?
2. What are the obstacles encountered by the teacher in teaching Mathematics by using EFL English in the Fatih bilingual classroom?
3. What efforts did the teacher make to solve the problems that arose in teaching Mathematics using EFL English at Fatih Bilingual School?

Research Objectives

1. To investigate how far the teacher used EFL English bilingual teaching of Mathematics at Fatih Bilingual School, Banda Aceh

in terms of opening activities, main activities and closing activities.

2. To investigate the obstacles encountered by the teacher in teaching Mathematics using EFL English in a Fatih bilingual classroom.
3. To investigate the teacher's efforts to solve the problems encountered in teaching Mathematics using EFL English in the Fatih bilingual classroom.

LITERATURE REVIEW

Bilingual Education and Bilingual Learners

Chadwick provides a classic definition of bilingual education: Bilingual education is instruction in two languages and the use of those two languages as mediums of instruction for any part, or all, of the school curriculum (Chadwick, 2012). Cambridge (2013) uses the term 'bilingual education' to refer to the use of two or more languages as a combined medium of instruction for 'content' subjects such as Science, History, and Mathematics. The term 'bilingual' describes individuals and groups of people who use two languages for inter-cultural communication in varying contexts (Mehisto, 2012). A polyglot is a person who can use several ie. more than two languages, in fact many Acehnese are polyglots even before learning English as they can speak Acehnese and/or a local language like Gayo plus Qoranic Arabic as well as Indonesian. A bilingual learner is a student who uses her first language (L1) for communication at home and in her community, and who uses a second language (L2) such as English for teaching-learning. Her teaching-learning processes can take place in a variety of teaching-learning and educational relationships. She may study-learn all her subjects through her L2, or if the learner follows a bilingual school program, then she may have some lessons that use L1 while in the rest of her lessons she will use the L2. Therefore, such teachers/students are referred to as bilingual teachers/learners (Chin, 2005).

Bilingual Education in Indonesia

The official use of bilingual education in Indonesia started in 2004 and has gained in popularity since. In the 8 years to 2012, 1300 schools categorized as international standard (bilingual) schools were established (Margana, 2013). The implementation of the bilingual program refers to the Acts of the Republic of Indonesia Number 20 of

2003, article 50, clause 3 which advocates that the Indonesian government together with each local government have to organize at least one unit of education at all levels of education to be developed as a unit having an international standard of education (Kedaulatan Rakyat, 2013).

Potential Benefits and Potential Drawbacks of Bilingual Education

For a student whose English skills are limited, it may be better to teach that student using their native language. If subjects with difficult topics can be taught in their L1, students with limited language skills will not be left behind because they are not in a rush to learn the L2 that must be mastered as well. However, there is also a growing body of evidence (Mehisto, 2012) suggesting that there are potential benefits to individuals, schools, and societies in being bilingual like increased mental flexibility, improved inter-cultural skills, and increased opportunities for global exchange and trade.

Schools with instruction in only one language, that is the L1, cause bilingual students to have less chances to use their English L2 at school. This can slow down development of their English skills, which can ultimately affect the ideal career that they want to achieve in the future (Chin, 2005). Chin has also added that when bilingual education programs provide some content instruction in the native language, limited English proficient students with the same native language and in the same grade tend to be grouped together in self-contained classrooms, unlike in most English-only programs.

The Theory Behind Bilingual Education

Vollmer (2007) has stated that content subjects and language are inextricably linked. Learners cannot develop academic knowledge and skills without access to the language in which that knowledge is embedded, discussed, constructed, or evaluated nor can they acquire academic language skills in a context devoid of academic content. Language and other ways of communicating are very important to learning specialist content subjects like mathematics rather than just using the L2 itself as a subject lesson.

Supporting and Opposing Arguments Concerning Bilingual Education

The implementation of bilingual education programs have been criticized by some parties who have argued that bilingual programs

discriminate against some students. However, many experts also refer to the strengths of bilingual programs. Chin (2005) has stated that there are many different variations in how much to use the L1 in bilingual teaching-learning. She makes some points that are in support of and some against the implementation of bilingual education. Many experts embrace bilingual education because it can help students who have limited language skills to follow the content subjects as they smooth out and develop their English. Bilingual education can also help students with limited language skills develop both their L1 and their L2 skills. Lewis (2007) has mentioned that the skills used with the L1, mother tongue, can facilitate the development of their L2, English skills.

One of the arguments that most often appears against bilingual education is that bilingual education does not make a significant development of the students' language skills because of its emphasis on using the L1 as well. A lot of time is spent clarifying things in the class-room using the L1. Nevertheless, other research has also denied the basic assumptions of this argument. Strong ability and proficiency in the native language can support the learning of English, making the process easier and quicker (Cummins, 2013). Secondly, most of the lessons that take place using the L1 can be easily transferred into English (Genesee, 2001). This is true not only for content areas like Mathematics, Science, and Social Studies, but also for language arts skills like speaking, reading, and writing. Being a fluent speaker in an L2 does not mean losing any ability to use the L1.

Teaching Mathematics

Sasse (2016) has stated that there are some linguistic difficulties in teaching Mathematics that include Mathematical vocabulary. Many words in Mathematics lessons are difficult to understand and teachers need to master technical language if they have to teach Mathematics using the L2. Mathematical vocabulary includes words specific to Mathematics, such as equations, algebra, and so on. Daily vocabulary can also have a different meaning when used in a mathematical context eg the meaning of the word “square”. Students must learn to connect mathematical symbols with concepts and both the L2 and the L1 language used to express those concepts.

Teaching Mathematics in Terms of the Opening, Main, and Closing of the Lessons

Milkova (2016) has said that when a teacher wants to create good teaching-learning activities, the teacher must make a successful teaching plan that includes three key components, viz: (i) objectives for learning, (ii) teaching-learning activities and also (iii) strategies to assess student understanding. Bohlke and Richards (2011) wrote that at the end of the lesson, it is recommended to stress the conclusion from the lesson to show what the lesson has tried to achieve. This is also useful to reinforce the points of the lesson, to suggest the next topic, and to prepare students for what will follow.

A frequent mistake of teachers is to fail to appreciate the importance of the beginning of the lesson and the close of the lesson. In the opening of the lesson, teachers should attract the students' attention and motivate them to learn. In the beginning of the teaching-learning, the teacher must introduce the subject and the material in such a way that it will arouse the curiosity of the students so that they will pay more attention to the lesson. Brophy (2011) has stated that the opening of the lesson should be clear and detailed about what the students will learn, why the topic is important, how it relates to what they already know, and how it will happen.

The Role of L1 and English in Learning Mathematics

Research has shown that student use of their L1 can have a big and important role when learning Science and Mathematics in English. Even when teachers cannot speak the L1 of their students, this need not be a problem when students are allowed to use their L1 during the classroom teaching-learning, both their academic mathematics skills and their development of English often show marked improvement in parallel (Kang & Pham, 2005).

Previous Studies on Teaching Mathematics Bilingually

One study that was done involved a Spanish-English bilingual class that resulted in the students performing better in problem solving when they used their L1 instead of using the L2, especially when the problems were difficult, as they tended to use more complex strategies with their L1 (Clarkson, 2006). El-Dash and Busnardo (2001) did research on Brazilians learning Mathematics using English. The results showed that most of these teenagers preferred to use English rather than Portuguese in terms of communicating and discussing the problems.

Preferring to use English rather than Portuguese can be attributed to the general perception that English is a more prestigious international language especially when used amongst teenagers.

A similar study was done in the Philippines by Amamio (2000) on the attitudes of students, teachers and parents towards the use of English and Filipino Tagalog as the medium of instruction in delivering comparative subject matter. Both the students and the teachers preferred the use of English as the medium of instruction because the teachers considered that English was an easier language with which to explain new ideas and concepts. The teachers also considered that English was an intellectual language that can be used as a source for technology and information resources. However, the parents preferred the use of the Filipino Tagalog language because it is a language that they can be used as a medium for thinking and for expressing themselves.

RESEARCH METHODOLOGY

The purpose of this research was to find out and describe to what extent the teacher used English for teaching Mathematics at Fatih Bilingual School Banda Aceh in terms of opening activities, main activities, and closing activities. This research was meant to find out the obstacles the teacher encountered and what efforts she had made to overcome those obstacles in teaching Mathematics bilingually. A descriptive qualitative method was used for this research in order to describe and understand the teaching activities in the classroom.

Research Setting

This study was done at Teuku Nyak Arief Fatih Bilingual School Banda Aceh located at Jalan Teuku Nyak Arief no. 1, Darussalam, Banda Aceh. The research was done with grade 10 at the senior high school. The class observations were done three times, each with a two-hour-meeting: note, a one hour lesson is 40 minutes long.

Research Participants

The subject of this research was a female teacher who teaches tenth grade Mathematics at SMA Teuku Nyak Arif Fatih Bilingual School in Darussalam. She is a well-trained Mathematics teacher because she finished her masters degree in Mathematical-Science at Deakin University in Victoria, Australia. In addition, she has been teaching at

Fatih for six years. As observed by Patton (2000), limiting the number of respondents in a qualitative study is not aimed at generalizing but at clarifying the ideas. The researcher did not include the students as participants because the researcher limited her study only to the teaching of Mathematics by using English so the researcher decided that the qualitative data obtained from observing and interviewing the teacher was enough to answer the research questions for this study.

Research Instruments

An observation sheet and an interview guide were used as instruments for this research. Three components had to be observed in the introductory activities. Then there were six main components with twenty eight points that had to be observed during the observations of the main activities while in the closing activities, two points had to be observed. The observation guide was modified from that used for teaching supervision at SMA Teuku Nyak Arif Fatih Bilingual School.

This research used in-depth interviewing, also known as unstructured interviewing; a type of interview to collect information in order to achieve a holistic understanding of the interviewee's point of view or situation. There were fourteen questions in the interview guide. The questions for the teacher were adapted from Visconde (2006). During the interview process, the teacher was recorded from the beginning until the end of the interview. The time for interviewing the teacher was as long as needed in order to get the detailed information required.

Technique of Data Collection

The data was collected during two weeks from January 10th to the 26th, 2017. There was one female Mathematics teacher to be observed and the observations were done three times. The teaching process and the classroom interactions were observed and recorded using a video recorder to video tape the whole of the teaching-learning processes. The observation sheet was used to support the data collection. Afterwards, the teacher was interviewed and asked some questions based on the researcher's findings during the observations.

The interviews were done with the one teacher who has been teaching the tenth grade at SMA Fatih Bilingual School for some years. The information from the teacher was useful to clarify the data from the recordings and to prevent any bias occurring during the observations. Open-ended questions were employed in this research to provide more

information related to the questions that were asked. During the interviews, the researcher used an audio recorder and took notes as well.

Technique of Data Analysis

Descriptive qualitative analysis was done with the data from the observations and interviews. The researcher used five specific steps of data analysis from Miles, Huberman and Saldana (2014) to analyse the data, namely: (i) listen to the tapes and transcribe the interviews, (ii) define codes so that they will be consistent over multiple interviews (iii) read the transcripts several times over a period of time to become familiar with what has been said and code the interviews. After coding, (iv) make a separate summary of the coded data listing what the respondent said under each code. (v) Step five is writing an overall interpretation and summary of the data.

One more strategy that the researcher used to check the relationship between the raw data and the interpretation was “checks on the data” as suggested by Hitchcock and Hughes (1995) who also suggested using re-interviewing. Checks on the data can be thought of as a check on the connection between the data and the interpretation that starts with the respondent. After the researcher had summarized and had an idea of her interpretation, she took the transcript and her interpretation back to the respondent and checked whether the respondent agreed with the researcher’s interpretation.

The observation sheet that the researcher used when observing the teacher during the teaching-learning process in the classroom was analysed narratively into findings. The data was grouped and classified based on the research questions in order to get accurate interpretations. Data transcripts that were irrelevant or that overlapped were deleted. The data was summarized for each meeting and from these summaries, an overall account was constructed of the behaviour of the teacher in the Mathematics lessons.

RESULTS AND DISCUSSIONS

Results of The Extent to Which English Was Used in The Teaching of Mathematics at Fatih Bilingual School Banda Aceh

On the first meeting observed, the teacher used a brainstorming session before the lesson started using the logic of the students, not from a book. At the beginning of the new topic, the teacher asked her

students about union in sets and asked who could show what union looked like by drawing it on the board. When the students had enough background of the new topic, the teacher started her explanation and wrote up the important points using a smart board. All the explanations were summarized into points and written with colourful pens on the smart board. While giving the explanations to her students, she invited them to interact with questions and comments. After the teacher finished providing the material systematically, she presented one question to the class concerning the previous topic and all the students seemed to remember about that topic, so that most of them could answer the question straight away. After she had presented the question in English, some of her students answered the question in Bahasa Indonesia. She let them do that but after those students had finished their answer, she translated back to the students the important points from their answers in English.

Every session of lessons was allotted forty minutes. There was a ten minutes break after each session. Mathematics was always two sessions making a total of 90 minutes. The first session was used to do the explanation of the topic and the exercises and the second session was used to answer the practice questions together on the board. One student would come out in front of the class and write her answer on the board. The teacher would then let her class decide whether the answer was right or not. If it was not right, then other students were asked to give the right answer. So the teacher only operated as a facilitator here. Her job was asking the students what was right and she then fixed the answer on the board. Students were encouraged to present their work both orally and in writing. During the discussions, the teacher kept giving them other examples to make sure the students' understood and most of the students raised their hands trying to show their answers on the board. The students checked their own answers and they made a lot of comments about their work, however most of the comments were in their L1, Bahasa Indonesia.

Based on the three meetings that the researcher observed, no closing activities were done. Mathematics was all about exercises. The students did the exercises, then both the students and their teacher discussed the answers. When the students had difficulty to finish an exercise, the teacher gave them more similar exercises and the pattern was repeated. The teacher did not have enough time to conduct reflections or to summarize the lessons. Like on the first day of the observations for example, the teacher only reminded her students to

bring their notebooks the next day because she would then collect their notebooks and check their homework. She emphasized to all the students that the homework needed to be finished by the next day because she would give them scores and put their scores in the scores list. She closed the meeting by saying *salam* and then let the students leave the classroom for their break.

Results for The Obstacles That The Teacher Faced in Teaching in A Bilingual Classroom

The Mathematics teacher stated that Teaching Mathematics bilingually was challenging because it was different and that Fatih was different from other schools. Not all Mathematics teachers could deliver their subject in English. Mathematics itself without involving English was already complicated, and now she had to give the lessons in English which was even more complicated so the result was further complicated. At first, she felt overwhelmed but as six years has now gone by, she survived and is still at that school teaching Mathematics in English.

In the first year of her experience in teaching bilingual classes, she had to make sure, she herself understood all the terminology because when she studied at the University for her bachelors degree which was in Mathematical Science, she learnt it all in Bahasa Indonesia, and then she had to teach it all in English. After four years studying Mathematics concepts in Bahasa Indonesia, then she had to change her knowledge of Mathematics concepts to English. So her first year was hard, but now, as time went by, she has got used to it, and now, she can do it well. She stated that she was proud of herself because she is a Mathematics teacher who can teach Mathematics in English.

There are difficulties when she has to teach students in seventh grade, first semester and also in tenth grade, first semester for those students that come from other schools that are not bilingual. Then after they start with Fatih, they will often have difficulties when they have to communicate using English. Students also face some difficulties in understanding Mathematics in English because they have to know the definitions and the terminology in English, and they have to adapt themselves to understanding the instructions that are given in English. The text-books are also in English so the teacher forces them to understand the lessons in English while she also teaches them in English. There have been situations where some students did not understand her explanations and she had to repeat using even simpler

explanations in English yet those students still did not completely understand the subject matter so she then had to use their L1 to make sure they understood.

Due to it being a hard topic and to the language barrier, she often missed out steps in her lesson plans. Most of the time, steps for the main activities had to be done twice to get over the language hurdle. She starts her explanations in English. Then she checks her students' understanding. Then, if there are a lot of students who still do not get the important points in her explanations or after she has tested her students, it is obvious that some are still confused, then she has to repeat her explanations one more time using code sharing with their L1, Bahasa Indonesia, and honestly she found this was time consuming and when she did that, it meant less time for her to discuss the questions and to do practice exercises with her students.

Another obstacle she faced in teaching Mathematics bilingually was when excellent English was needed for some topics. Sometimes there were topics that required a lot of explanations and descriptions. Word problems are one of the examples. After all, she said, she did not expect her students to be able to speak English fluently. They needed to know English just enough to understand the concepts of Mathematics and the explanations she gave them.

Results of How Teachers Solve The Obstacles of Teaching in A Bilingual Classroom

When the teacher had to overcome difficulties in teaching, she would do things to make it easier to handle her students: To overcome some issues, she used code switching. She would explain the lesson first in English and then she would ask her students questions to see how far they understood the subject. If they still seemed confused, she then translated her questions and her explanations into their L1, Bahasa Indonesia, so that they could grasp the concepts. This was actually real bilingual teaching. She said that she had studied this and therefore she used it in her classroom. After she finished translating into Bahasa Indonesia, she then asked her students to review the lesson again but in English. For example: "Now you know what *sisi depan* is in English, it is called the opposite". She stated that this was a good way to test her students' understanding.

She gave one example from grades 10 and 11 last year. In grade ten, the students tended to understand her more when she taught them Mathematics concepts using video. When a topic was hard and she

needed to make the explanation simpler, she said that the use of video was very helpful. First, she would introduce the topic. Then she would check the students' previous understanding and knowledge by asking questions. Usually she would know how deep the students' knowledge was about the topic by asking questions before the explanations. Next, she would show them a video or a power point show while she explained more about the topic. She put her explanations into the simplest possible steps to get her students to understand the topic. The students appreciated that very much and seriously followed her explanations. That way, the hard topics were made to seem easier because they were supported by media to make them simpler. She uses videos, pictures, power point shows, and other Mathematics tools that could help her in explaining the mathematical concepts, facts and language.

When her students still found it hard to understand some questions, she explained the lessons using even simpler ways. She gave them examples that were related to their daily lives. And when there were questions that were very complicated to digest, she paraphrased them with her own words but she still used English. This was how she minimized the use of their L1, Bahasa Indonesia, because she did not want her students to use their L1 too much. Even though she knew that her students needed to understand Mathematics concepts equally both in their L1, Bahasa Indonesia, and in English, she would rather teach them using English all the time. She knew that they were already used to using their L1, so what her students needed was a little bit of a push to make them communicate more using their L2, English.

Discussion

This study points out an interesting finding concerning the introductory activities in teaching Mathematics in a bilingual classroom. There were three points that were listed in the classroom observation sheet. In one of the points, there was a statement saying that the beginning of the learning process is a greeting and a prayer and also preparing the physical and mental readiness of the students. From the three whole class observations, the teacher did not use any greeting and prayer at the beginning of her teaching. Also, there were no activities for the students' preparations either mental or physical. After the initial greeting, she moved directly into the activities associated with that day's current topic and with the previous topic or with the students' experiences. Her reasons for doing this was to use the time

available effectively because Mathematics always needed more time for explanations than it was given in the time table. Hashimoto (2002) has discussed in depth the importance of motor skills and physical readiness as a strong predictor of educational success. When parents, caregivers and teachers promote movement and exercise, it is shown to help with not only a healthier view of themselves, but a higher emotional IQ, solid social skills and essential learning tools that students will need in a school setting. He said, "To perform well in an educational environment, a student needs to be able to: sit still; pay attention; use a writing instrument and to control a series of eye movements."

In terms of the main teaching activities, there were points noted in the observation sheet about having activities to encourage the students to elaborate on the information by using English, organizing activities which encourage the students to present their work both orally and in writing in English and to encourage the students' participation through the teacher's interactions, with the students and the learning resources by using English. Caicedo (2015) found that active class participation was helpful for their overall learning. It was fascinating to find that over 90% of the students said that instead of talking in a big class, they usually preferred participating in small group discussions. Based on the three times observation during the teaching-learning processes, there was no activity done to encourage or motivate the students to participate in the classroom. The teacher focussed directly on delivering the topic and getting the students to understand it. When the researcher asked the teacher about why encouraging the students to engage actively in the classroom was not included, she answered that for some class meetings where the topic is not too complicated and there is available time, she encourages the students, one by one, by asking them to make their own questions and let other students answer the questions. A study done by Borromeo-Samonte (2008) concerning the attitude of Filipino students toward Mathematics taught in English showed that the students' attitudes toward the subject matter were shaped because of the integrative motivation from themselves because they could integrate themselves with the culture. The students' abilities, intelligence, and attitudes were influenced by their motivation.

In terms of closing activities, there were no closing activities in the three periods observed. The allotted time was not enough to finish all the practice exercises so the lessons ended without closing. Bohlke and Richards (2011) say that at the end of the lesson, it is recommended to

bring the lesson to a conclusion to show what the lesson has tried to achieve. It is also useful to reinforce the points of the lesson, to suggest the next topic, and to prepare the students for what will follow.

Concerning teaching Mathematics classes bilingually, bilingual at Fatih means that the two languages are used but not necessarily in the one lesson. Science, Mathematics, and English lessons are preferably taught with full English while other lessons such as Religion and Social Science are taught with full Bahasa Indonesia. Mehisto (2012) has stated that bilingual education typically means that learners study some non-language subjects such as Geography and History through their first language while some other non-language subjects such as Science and Mathematics are studied through a second language.

Somehow, in the process of teaching Mathematics, Science and English, the teachers at Fatih Bilingual School try to decrease the use of Bahasa Indonesia to a minimum. The school policy says that a 30 percent maximum is allowed for using Bahasa Indonesia for those three subjects. For some teachers, they try to use full English in the classroom to grow the students' habits of communicating in English both outside and during the lesson. It can be concluded from the observations and the interviews with the Mathematics teacher at Fatih Bilingual School, Banda Aceh that the proportion of English used in the classroom depends on the individual teacher. Teachers' understanding of bilingual teaching is shown in the way that they apply the two languages when interacting with their students. The portion of time spent using each of the two languages while teaching was determined by the teacher herself. The teacher controls the classroom and decides whether to use more English and less L1, native language, or whether both can be used equally or whether to use up to 30% for the L1. Language cannot be formed if we only focus on subject matter and content language cannot grow if we just focus on learning English. One other point to note is that many Acehnese students are already polyglots ie. they are multilingual – as well as speaking Bahasa Indonesia most can also speak one or more local languages like Acehnese or Gayo or Tamiang plus many can also speak and even read formal Arabic for praying in the mosque.

CONCLUSIONS AND SUGGESTIONS

Conclusions

Regarding the first research question, the findings show that the processes of teaching Mathematics in terms of opening, main and closing activities were done using both Bahasa Indonesia and English. In the opening activities, the teacher used both languages to greet the students and to pray. However, there was no program of physical and mental readiness in the opening activities. In the main activities, the teacher also used both languages but mainly English plus some code switching and translation. At the end of the lesson, there were no closing activities since there was not enough time to answer all the questions and do all the exercises.

The other obstacle lay in making herself understood using the English terminology for Mathematics. At the beginning of her teaching it was hard but it got easier over the following years. After the teacher got used to teaching Mathematics bilingually, then it became the students' turn to make their learning run well bilingually. Once the students are capable of following the teaching-learning activities in both languages, then comes the National Examinations where students must understand and answer all the questions in Bahasa Indonesia. Students that have been forced to learn Mathematics for two years bilingually, and in their third year they have to face Mathematics in Bahasa Indonesia. This situation means the teacher may have to then do translations from English into Bahasa Indonesia.

The third research question dealt with the solutions for overcoming teaching obstacles in the bilingual classes. Some students are better when they learn concepts through videos or pictures. Some other students prefer to use charts for getting their understanding. When the topic is hard and pictures, graphs, or video cannot help much, then the teacher has to give examples, as many as possible. Teachers who find it hard to teach students with a minimal English background will probably have to use code switching. The teacher explained her lessons first in English and then she asked her students questions to see how far they understood the subject. If they still seemed confused, she used code-switching, translating her questions and her explanations into L1, Bahasa Indonesia so that her students can fully understand the concepts. Even after code switching if the students still found it hard to understand some questions, the teacher would paraphrase the questions using her own words till the students "got it".

Suggestions

To teachers who are teaching in bilingual schools, bilingual teaching is not an easy process since English is a foreign language not used in daily life and activities in Aceh. Bilingual teachers have to learn that bilingual teaching requires not only a great deal of subject matter knowledge, but also a good understanding of bilingual methodology so that as students develop knowledge, they acquire language as well. Teachers can join seminars or training about the implementation of bilingual education if necessary.

Concerning the obstacles that teachers face in teaching bilingual classes, the teacher needs to realize that teaching-learning occurs in the context of a social climate. The relationship between the students and their social behavior have a major impact on how well students learn English and how well all the students learn overall. Students cannot achieve well in an unwelcoming, hostile environment. Fortunately, the teacher has found some solutions to overcome her obstacles in teaching her bilingual Mathematics classes. However, this researcher proposes that to make teaching-learning processes run better bilingually, it would be better for teachers in all subjects to use both Bahasa Indonesia and English to communicate so students would get used to a bilingual environment. This will prepare the students for the coming integration with ASEAN and other trends in globalization.

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