Learning Difficulties in Understanding English Materials of Mathematics Education Students

Sri Wiyanah(✉) and Siska Candraningsih

Universitas PGRI Yogyakarta, Yogyakarta, Indonesia
sriwiyanah@upy.ac.id

Abstract. The study aims to analyze the difficulties of students of the Mathematics Education Study Program in understanding and using English learning resources. Students from the 2019/2020 Mathematics Education Study Program at Universitas PGRI Yogyakarta, Universitas Ahmad Dahlan, and Universitas Muhammadiyah Jember participated in the qualitative research. Tests, interviews, and documentation were used as data gathering procedures. Researchers, test questions, and interview rules were used as study instruments. Data collecting, data reduction, data presentation, and generating conclusions were among the strategies used in data analysis. The results shows that the students had got some learning difficulties in interpreting teaching materials in English, English terms (both mathematical and general terms), understanding mathematical concepts, recognizing the meaning of the question and writing the answer in English. Some internal and external factors in students' learning difficulties i.e., lower ability to speak, student habit, interest and concentration, parents' attention and living environment.

Keywords: English Material · English Mathematics · learning difficulties · Mathematics Education

1 Background

The language issue cannot be overlooked when it comes to preparing the next generation to compete on a global scale. This must be our way of thinking so that the Indonesian nation's future generations are not limited in their ability to compete worldwide due to language barriers. Every element of life, therefore, requires strong communication in order for everything to be delivered appropriately.

Aside from the ability to communicate through language, the next generation must also be able to solve issues, think critically, and be innovative. This talent can be acquired through school-based mathematics instruction. Mathematical skills are critical for students' educational success in the future [1]. As a result, mathematics is now a compulsory subject in elementary and secondary schools. In college, math is still necessary.

It is possible to start learning proper English in school, as well as training students' problem-solving skills, critical thinking, and creativity. As a result, teachers and prospective teachers, particularly mathematics instructors and aspiring mathematics teachers, must be fluent in English. It will undoubtedly be difficult for the teacher to teach mathematics to kids who are simultaneously learning about language. Since the lectures,

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mathematics teachers have been using English learning tools to help them improve their ability to utilize good English.

Students enrolled in the Mathematics Education program can develop their skills by learning from a variety of sources. Students can use textbooks, scientific publications, and other sources. For course content in English, students can easily obtain textbooks or other sources. Students, on the other hand, will not be able to fully master the material offered by English-language sources. 68% of students scored below the graduation threshold on exams taken after students mastered English sources in the English Mathematics course at Universitas PGRI Yogyakarta in the Mathematics Education Study Program. 85.71% of students in the Number Theory course scored below the graduation standard after using worksheets and English materials.

The problem of learning difficulties in mathematics is a global issue, owing to the fact that mathematics is an abstract topic [2]. Moreover, the inability of students to solve test questions can detect difficulties for these students in learning a material [3]. The student finds it difficult to interpret books or other English-language sources, according to the interview results. They cannot, however, be certain of their problems in learning to utilize English-language sources of information. As a result, students are unable to appropriately answer test questions.

Of course, this problem should not be ignored. Students must be assisted in identifying the source of their challenges and the elements that influence them so that changes may be made in future learning and future teachers can be formed who are experts in their subjects. As a result, the researchers intended to look into the challenges that Mathematics Education students face when using English-language lecture resources.

Some problems that can be identified i.e. Mathematics Education students have low test scores after carrying out the learning process with English language sources, find it difficult to learn English lecture material sources, do not know for sure where the difficulty lies in understanding the sources of English lecture material, and do not know the factors that cause difficulties in understanding English learning resources. The issues that will be examined in this study are limited to examining the challenges that Math Education Study Program students have understanding English lecture material. This research has the potential to improve the way people learn based on the findings of the analysis in order to reduce the challenges they face. Furthermore, the lecturer can use the findings of the analysis as a resource for further learning.

"What are the difficulties and factors that impact students in the Mathematics Education Study Program in understanding lecture material utilizing English-language sources?" is the problem formulation from this study. The goal of this study is to determine where the issues are occurring and what factors influence students in the Mathematics Education Study Program's ability to comprehend lecture material from English-language sources. The value of this study is that students and lecturers can use English-language materials to figure out where they are having trouble understanding lecture material. Students might adjust their learning styles in response to the findings of the analysis in order to reduce the challenges they confront. Lecturers might use the findings of the analysis to help them plan for future learning.

Learning difficulties are student barriers during the learning process so that they get less than optimal learning outcomes [4]. In addition, learning difficulties are a situation

in learning with the emergence of an obstacle that affects students in improving the quality of learning achievement [5]. Learning difficulties are learning barriers where students are not educated properly, due to interference, both from internal and external factors. Student external factors cause errors in learning. Some errors in learning include process skill errors, problem understanding errors, and notation errors [6].

Many things can affect students' difficulties in understanding the material given. In understanding a material, students may experience difficulties in reading the material due to repetition, omission, and addition of syllables or not paying attention to signs [7]. The difficulty in understanding mathematics learning can also be due to the use of complex language so that it can be difficult for students to understand the meaning [8]. Learning difficulties can also be experienced by students due to their lack of mathematical and cognitive knowledge [9].

English is not a second language Indonesia It causes students' ability to speak English is also necessary. English proficiency has an impact on students' ability to recognize the information provided and identify what is needed to be solved. Students have difficulty understanding and recognizing keywords that appear in questions, resulting in a lack of ability to translate keywords into mathematical equations or expressions. Students need to practice translating real-world problems into mathematical models and translating their solutions back into the context of the original problem..Another big challenge faced by students is the inability of students to understand English which is the main language of instruction. Most students fail to translate English into mathematical equations so that students fail to apply mathematical concepts [10].

Learning difficulties can be in the form of difficulties in listening, speaking, reading, writing, reasoning or counting [11]. There are three types of student difficulties in learning mathematics, namely (1) students are constrained in applying concepts, (2) students are hampered in implementing principles, (3) students are hampered in dealing with verbal problems [12]. Learning difficulties can also be in the form of difficulties in reading comprehension. Students who put considerable effort into language processing and reading comprehension may have more complex needs when learning to solve math word problems [13]. Problem translation involves understanding the statements in the problem, and thus requires knowledge of both general and mathematical vocabulary. The main difference between the two types of vocabulary is that mathematical vocabulary carries meanings that are specifically related to the domain of mathematics [14].

Learning difficulties can be caused by various factors. Learning difficulties are caused by genetic and/or neurobiological factors that alter brain function by affecting one or more cognitive processes related to learning [15]. The factors that cause learning difficulties consisted of students, school and community environment. Students' learning difficulties consist of interest, level of intelligence ability, study habits, learning motivation, and concentration. Educators/teachers, campus atmosphere, and libraries are the part of school factors. Whereas, the family environment, parental attention, and the comfort of the home environment for learning are included the factors form the community environment [16].

Learning difficulties are generally caused by five factors, namely reading difficulties, writing difficulties, expression difficulties, calculation difficulties, and learning difficulties in general [17]. Each student is unique, has different weaknesses and cognitive strengths that need to be considered in learning mathematics [18].

The Mathematics Education Study Program's English course covers a variety of topics, including how to recognize, comprehend, and use basic mathematical symbols, English terminology in in various contexts, and how to re-express and communicate English mathematical material both in writing and vocally. Students should be able to think mathematically in English, understand material or ideas related to the field of English Mathematics develop mathematics learning materials in English, and master and also apply English Mathematics in learning English for Mathematics.

Learning resources are objects, data, facts, ideas, people, in the form of package books, modules, student worksheets, realia, models, markets, banks, museums, zoos, and markets and others to support the learning process [19]. An educator must have skills in utilizing and creating learning resources. Teaching materials are things that must be prepared by the teacher before carrying out learning. Teaching materials consist of various types such as printed materials (for example, textbooks, workbooks and non-print materials for example, audio, video, Internet/computer-based materials [20]. Teaching materials are materials that are needed and used in managing the teaching and learning process or tools that are very important for teachers to organize learning efficiently and to improve student learning achievement [21].

2 Material and Method

This study is qualitative in nature. Qualitative research is undertaken to describe and understand occurrences, events, social activities, attitudes, perceptions, and thoughts of an individual or a group of individuals [4]. Students from the Mathematics Education Study Program at Universitas PGRI Yogyakarta, Universitas Ahmad Dahlan, and Universitas Muhammadiyah Jember participated in the study.

Tests, interviews, and documentation were utilized to collect data. The final data on student learning outcomes is calculated using a test from the final evaluation. The test is a systematic and objective tool or procedure for generating data or information that someone need in a timely and appropriate manner. The test that was employed was one that was written in the form of a description. Before the items are delivered to students as evaluation material, they will be tested for validity, reliability, and difficulty.

Students who were the subjects of the study were interviewed. Students' learning issues in understanding English lecture material were discussed in the interview. The outcomes of the interviews were kept on file as evidence during the interview. The students that were questioned in this study were chosen based on their test results. Three students the lowest exam scores, three students with average test scores (in the center), and three students with the highest test scores were among the nine students to be interviewed. The goal of utilizing the aforementioned method to choose students is to compare the challenges that students in each group face and the reasons that cause them. Documentation is a written record of past events. Documentation is the recording of data from a previous occurrence. Writing, photographs, and historical works can all be used as documentation. Documents are supporting data in qualitative research.

Research instruments are the tools used to collect data. They are the interview guideline, the researcher, and the test question. Researchers are the primary tool, with problem-solving ability tests and interview standards supporting them. Researchers are viewed as a tool for revealing field facts, and there is no most flexible and appropriate instrument for revealing qualitative data unless the researcher also claims that humans as a data collection instrument offer advantages, such as the ability to be flexible and adaptive, and the ability to use all of one's senses to comprehend something. This test uses a question sheet to describe learning outcomes as the instrument. The interview guide is a non-test instrument that includes questions designed to elicit data or information from informants. The interview technique used a structured interview.

Data analysis techniques consist of data collection, data reduction, data presentation and drawing conclusions. Data analysis can be done if the data has been collected through the data described above. At this stage the author described all the data obtained through written tests and interviews conducted on students.

Reduced data will give a clear explanation and make it easier for the author to collect information on student learning issues by summarizing, choosing the essential points, focusing on the most significant points, looking for themes and patterns, and removing irrelevant information. Following the reduction of the student's learning problems, the data is displayed (data presentation). Data can be presented in qualitative research in the form of brief descriptions, charts, and connections between categories. The data gathered from written tests, interviews, and documentation of student learning difficulties that have been reduced by summarizing, selecting, and focusing on the important things is then presented by describing students' learning difficulties in understanding English learning materials obtained in a similar manner, simple to comprehend, then draw conclusions [22].

3 Result and Discussion

The researchers' data, as well as interviews and documentation, were used in this study. The research began with 35 students from the Mathematics Education Study Program receiving English teaching materials. Through classroom learning activities, students were able to acquire and comprehend the information. Students were also given the opportunity to discuss their findings with their peers and teachers. Students worked on test questions linked to the previously learned topic in the next activity. Researchers also spoke with a number of pupils who were chosen at random. Furthermore, several representative students were interviewed by researchers.

Students are given the test after they have studied the English teaching materials. The goal of this test is to figure out how well students understand the material they have been taught. The test consists of four questions and is a description test. The test questions have been determined to be valid and trustworthy. The results of student tests are fairly diverse. The outcomes of student tests are ranked from lowest to highest. The appendix contains all of the data on student test outcomes (Table 1).

Nine students were chosen as interview subjects from a total of 35 pupils. Three students had the lowest scores, three students received the medium scores, and three students received the best results.

Table 1. Students score

No	Description	Students Score
1.	The highest score	100
2.	The lowest Score	43
3.	The Average Score	74.91

Table 2. Selected Students Interview

No	Students' Code	Mark	Category
1.	IFS	43	Low
2.	SSN	43	Low
3.	UJ	45	Low
4.	NES	75	Medium
5.	LAN	78	Medium
6.	NM	79	Medium
7.	BR	90	High
8.	DW	100	High
9.	EM	100	High

The following are the students who were chosen:

The description of the data based on Table 2 shows learning difficulties experienced by students in understanding English instructional materials. Students have trouble deciphering English-language educational materials. All of the students interviewed, including those in the low, middle, and high test groups, reported to having difficulty interpreting the teaching materials when they were delivered in English. All of the students used internet applications to assist them interpret the teaching materials sentence by sentence. It interprets word for word without regard for the reality of the sequence, resulting in meaning that is sometimes irregular and pupils finding it difficult to understand the sentence. The following is an excerpt from the interview:

"Because there are still limits in speaking English, English teaching materials are more difficult." (IFS)

"It's hard to understand arithmetic content because it's written in English." (IFS)

"In English teaching materials, I use a dictionary as well as the Google Translate program to interpret texts. (IFS)"

While other participants have the similar problems based on the following extract of interview:

"If mathematics teaching materials are provided in English, it becomes difficult since it is difficult to interpret the terms, making it difficult to match the words, which makes finding the answer perplexing." (SSN)

"Usually, using the Google Translate tool, it helps interpret the information, but sometimes the meaning is inverted, making it difficult to interpret." (SSN)

The participant who also got low score has same problem with English Material:

"The English-language mathematics teaching resources are actually rather good, however I find it quite difficult to grasp the contents/questions due to a lack of vocabulary." ... It is made easier to grasp by utilizing the Google Translate tool, which, while the meaning is occasionally erratic, is highly useful. The mathematical content itself is not difficult if you comprehend the concept; nevertheless, if the material is in English, you are concerned that you will make mistakes in interpreting it. Due to very limited English language skills, it is difficult to use English-language materials." (UJ)

The following information was obtained from interviews conducted with EM subjects:

"If the mathematics material is in English, at first we found it difficult because all the words were new, especially for the mathematical terms. If translated using an application, it means that it is confused with the previous sentence. But as time goes by, you can adapt because there is repetition of the words used as well." (EM)

This causes pupils in the low and medium categories to take longer to comprehend the teaching materials offered. If students in the high group study teaching materials for a given subject in English multiple times, they gradually become accustomed to the terms used, and the time required is less than it was when they first used mathematics teaching materials in English.

Students struggle to understand words in English, both mathematical and non-mathematical. The terms utilized in English were difficult for all of the students who took part in the survey. The use of non-mathematical words is more difficult. The English equivalents of mathematical terms are nearly identical to the Indonesian equivalents. Furthermore, many mathematical words make use of symbols that are already widely used. Only two out of nine people said mathematical terminology were more difficult to understand than everyday English ones. The following is an excerpt from the interview:

"This difficulty can be sensed both in terms of language and in terms of mathematical content." (IFS) "Vocabulary is challenging in general, not only for mathematical terminology." (LAN)

"In math words, difficult/unfamiliar vocabulary is vocabulary. When it comes to interpreting the same questions, if there is vocabulary that I am familiar with, interpreting becomes easy." (NM)

"It's not only the math words that cause problems; English might be tough to understand at times." "I'm having trouble deciphering that because I don't have a large vocabulary, so I'm not sure what it means." (BR)

"I think writing in English is more challenging than reading since I enjoy being perplexed while writing mathematical phrases in the form of symbols like x squared. Everything is difficult, both in English and in mathematics, although English in general is considerably more difficult than English in mathematics because many symbols and phrases used in mathematics are nearly identical to those used in Indonesian." (SSN)

Students have difficulty in understanding mathematical concepts. Students also experienced difficulties in understanding mathematical concepts. Some students stated that the mathematical concepts themselves were difficult. However, some stated that mathematical concepts were even more difficult if the language used was difficult to understand.

"They become perplexed in understanding mathematical concepts since they can't explain it." (SSN)

"For the mathematics content itself, it's not too tough if you comprehend the concept, but if it's in English, you're frightened of making mistakes in interpreting it." (UJ)

"The arithmetic concept is not tough; nevertheless, the language makes it difficult to comprehend." (DW)

Students have difficulty in determining the meaning of the question. In solving practice questions in English teaching materials, some students expressed difficulties in determining the purpose of the questions. However, some students stated that it was more difficult to understand the meaning of the material than the purpose of the practice questions. Accordance to the result, students sometimes have difficulty in understanding the questions given [23].

"I interpret the questions in the same way, and if there is vocabulary that I understand, that makes it easier to interpret." (NM)

"If the content is written in English, comprehending the questions is easier than understanding the material." (LAN)

"Understanding the questions is challenging as well because they must be translated, but it is easier than understanding long content." (NES)

"Because the phrases are shorter and more to the point, comprehending the questions is easier than understanding the material." (UJ)

"The questions are simple to interpret because the wording are short. It's difficult to interpret the sentence content if it's long and has a lot of it." (SSN)

"It's more difficult to understand the material than it is to understand the questions." (IFS)

Students have difficulty in writing in English. All the students interviewed stated that they had different difficulties when it came to writing down their understanding of the material they got in English. The students had difficulties in determining which vocabulary to choose and using the right sentence patterns. Eight of the nine students interviewed stated that writing comprehension math in English is much more difficult than reading math material in English.

"It's also tough for me to solve problems when I have to describe them in English since I have to find the correct terminology in order to write the answer." "Writing is considered more difficult than reading since when reading, certain words are already understood, and they can be assisted by placing the words that are previously known together." (IFS)

"I find writing in English more challenging than reading since I enjoy being perplexed while writing mathematical phrases in the form of symbols like x squared." (SSN)

"Writing is considered more difficult than reading since determining the correct spelling of each vocabulary word, as well as the grammar, is challenging." (UJ)

"Writing is seen to be more difficult than reading since faults in writing might lead to varied interpretations" (NES)

Factors causing student learning difficulties in understanding English teaching materials. The learning difficulties experienced by students of the Mathematics Education Study Program in understanding English teaching materials are caused some factors i.e. students and the environment.

Students' ability to communicate in English, their habits, their interest, and their focus are all factors to consider. All of the students who took part in the survey claimed that their inability to understand English teaching materials was related to their inability to communicate in the language. Students thought they had a limited vocabulary. Both ordinary English language and mathematical terminology vocabulary are required. This makes it difficult for students to interpret the material offered in Indonesian. Thus, the data got have great relation to the theory of learning challenges in reading that means it is as a difficulty to understand words, transmitted ideas, vocabulary use, and reading speed and fluency [24].

"I've struggled to learn English since I was in school. Although there is curiosity, I find it challenging to memorize because each sentence has a different word form. Because English is rarely spoken in everyday life, it is difficult to repeat." "Using English-language resources is difficult due to very limited English language skills." (DW)

"Because they do not use English every day, their vocabulary is severely deficient. Practice as little as possible and learn English. In addition, the environment is not conducive to studying English. There are no English speakers or workers in the area." (UJ)

"Seeing that the children can speak English gives them a desire to do so, but once they encounter the formulae, they become disoriented." It is also unfamiliar

to English speakers. "Neither does the surrounding environment speak English." (SSN)

Students are not used to using English as the language of instruction for teaching materials. Students feel they are in a comfortable position by studying teaching materials in Indonesian. When given teaching materials in English, some students try to find other sources about the same material in Indonesian.

"I have a severe lack of English vocabulary owing to a lack of study, and I use Indonesian on a daily basis, so I am overly familiar with it." (IFS)

Students in the low and medium test groups expressed a lack of interest in English, making it difficult for them to use English teaching materials. Students in the high test group reported that they were interested in learning English but struggled with grammar and vocabulary. It makes it difficult for them to comprehend materials written in English. Here, student's enthusiasm in a subject is one of the internal aspects that influence their learning challenges [25].

"I used to be uninterested in English, but I'm starting to see how vital it is today." (IFS)

"There is an interest in English, although it is still difficult to improve vocabulary." "I'd like to study English, but it's still difficult if all of the mathematics teaching resources are in English." (UJ)

"English is challenging for me because I'm not used to it, but I'm also eager in studying it." (NES)

"I am not a big fan of English." "I only listen to English music, but the subject matter does not appeal to me." (LAN)

"Actually, I'd like to learn English, but I'm finding it tough due to a lack of vocabulary." (BR)

"There is intrigue, but I find it tough to memorize it because every sentence has a different word form." (DW)

Several students stated they had trouble concentrating when they had to understand teaching material in English because the English language made them dizzy, and they could not focus on the material.

"Seeing that the children can speak English gives them a desire to do so, but once they encounter the formulae, they become disoriented." (SSN)

"I usually get lazy initially if the content is provided in English, therefore I can't concentrate." (LAN)

"Even if provided material in English, they choose to study it first and foremost." (NM)

Parents' attention is strongly proportional to the number of students who exhibit an interest in studying English. They receive undivided attention from their parents as they work to improve their positive abilities. Students who demonstrate little interest in

English, on the other hand, are usually allowed to do whatever they like by their parents. Parents did not respond positively or provide comments and encouragement to their children in order to help them enhance their abilities in many ways. A lack of parental attention is one of the causes of student learning issues.

"Parents are paying attention and supporting the inclusion of tutoring in primary school to improve English language abilities." (DW)

"My parents are highly supportive of my efforts to enhance my skills, including in English," says the author. (EM)

"When it comes to schooling, my parents are always supportive." (BR)

"My parents always support my decisions; if I accomplish good things, they will support me, but I am not interested in learning English." (NM)

"The environment and parents are not supportive of acquiring English language skills." "It's more essential to just let it go," says the narrator. "My parents are average, free, and don't respond to English," says the LAN. (NES)

"My parents are extremely supportive of my efforts to enhance my English skills." (UJ)

"Parents just leave which one, in my opinion, is the best." "Parents basically let it go whether they have to speak English or not," says SSN. (IFS)

Students do not get encouragement in any form from the surrounding environment in improving their abilities in various ways, especially in dealing with difficulties in learning.

"The classroom setting is truly helpful, but I don't take use of it because I'm uninterested." (IFS)

"The environment does not speak English either. There was English extracurricular in school, but I didn't take it. When it comes to learning, I think it's fine to deliver the information in English every now and then to help with habituation, but it needs to be supplemented with extra reinforcement so that no errors in understanding the mathematical concepts occur." (SSN)

"An improving English language skill is not supported by the surroundings or parents." (LAN)

Despite facing learning difficulties with various causative factors as mentioned above in learning English teaching materials for Mathematics Education students, it provides a new experience in the learning process. Students suggest that in the future lecturers can still provide teaching materials in English because it can be a challenge for students. This can also be a habit so that students become familiar with terms in English, especially terms in mathematics. This is in line with the opinion from S. As' ad, P. Sudira, and A. Hasriani, who state that to minimize student learning difficulties, it can be done by growing interest in learning and forming study habits. Students get two learning experiences at once. Experience learning mathematics and English [25].

"I agree that the teaching materials provided are in English since I can learn English while studying mathematics." "As a result, you gain two types of knowledge. Students can improve their English skills so that they have more options if they choose to continue their education. If the material is provided in English, it is required to provide further reinforcement." (EM)

However, students expect the teaching material provided not to use English continuously but alternately. In addition, students suggest being given footnotes for difficult terms and new ones. Lecturers are also expected to provide reinforcement for the material that students have learned using the material teaches English to ensure that students do not misunderstand mathematical concepts.

4 Conclusion

In conclusion, students in Mathematics Education have trouble reading instructional materials in English, terminology in English, including mathematical and general terms, grasping mathematical concepts, establishing the meaning of the question, and writing the answer in English. According to the findings, the learning challenges experienced by Mathematics Education Study Program students in understanding English teaching materials are caused by a number of variables, including internal factors such as lesser ability to speak, student habit, interest, and focus. Furthermore, some extrinsic elements, such as parental attention and living environment contributed learning difficulties in understanding English instructional materials.

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Authors' Contributions. Sri Wiyanah: Conceptualizing, writing manuscript, editing/reviewing, evaluating, final approving.

Sisca Candraningsih: Conceptualizing, designing, gathering data, analyzing, evaluating, writing manuscript.

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