

STUDENT ERRORS IN WRITING THE ENGLISH MATHEMATICAL OPERATION IN HIGHER EDUCATION

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Abstract

English has been well-known as the world's international language. As a means of global communication, it should be actively mastered both orally and in writing. Writing is one of the skills that must be mastered by the students. It is related to the words, phrases, clauses and sentences. Then, if the meaning is unclear, people will misunderstand about the meaning of the sentences. The research investigated student errors in writing the English mathematical operations. The research is focused on the operation of addition, subtraction, multiplication and division. The research used qualitative approach using test and interview to collect the data. After conducting the research, it shows that there are some types of errors found such as incomplete materials error, technical errors, errors in understanding the previous material, and language misinterpretation. Meanwhile, student errors in the type of data misuse, theorems and definition of misuse and also unverified solutions are not found on the research.

Keywords: *Error, English Mathematical Operation, Higher Education*

Abstrak

Bahasa Inggris telah dikenal sebagai bahasa internasional dunia. Sebagai sarana komunikasi global, Bahasa Inggris harus dikuasai secara aktif baik lisan maupun tulisan. Menulis merupakan salah satu keterampilan yang harus dikuasai oleh siswa. Hal ini terkait dengan kata, frase, klausa dan kalimat. Kemudian, jika maknanya tidak jelas, orang akan salah paham tentang makna kalimat tersebut. Penelitian ini menyelidiki kesalahan siswa dalam menulis operasi matematika dalam Bahasa Inggris. Penelitian ini difokuskan pada operasi penjumlahan, pengurangan, perkalian dan pembagian. Penelitian ini menggunakan pendekatan kualitatif dengan menggunakan tes dan wawancara untuk mengumpulkan data. Setelah dilakukan penelitian, ternyata terdapat beberapa jenis kesalahan yang ditemukan seperti kesalahan materi yang tidak lengkap, kesalahan teknis, kesalahan dalam memahami materi sebelumnya, dan kesalahan penafsiran bahasa. Sementara itu, kesalahan mahasiswa dalam jenis penyalahgunaan data, teorema dan definisi penyalahgunaan serta solusi yang belum diverifikasi tidak ditemukan dalam penelitian.

Kata Kunci: *Kesalahan, Operasi Matematika dalam Bahasa Inggris, Pendidikan Tinggi*

INTRODUCTION

English is a language that is well known as the world's international language. Although it is as an international language, in Indonesia, it is generally considered and taught as a foreign language. (Suharyanto, 2018). Actually, the term of foreign language in the field of language teaching is different from second language. A foreign language is a language that is not used as a means of

communication in the particular country where it is taught. While the second language is a language that is not the main language but is one of the languages used in general in a country. (Sudarmo, 2021)

In Indonesia, the policy of teaching English as a foreign language changes over time and changes in policies that are mostly influenced by economics and politics. In this era of globalization, it is required every

individual to prepare reliable resources, especially in the field of science and technology. In order to be able to master technology well, adequate knowledge is needed so that we can use it in facing the demands of a globalized world that is full of competition. In this case, the role of English is needed both in mastering technology and interacting directly. As a means of global communication, English should be actively mastered both orally and in writing (Prihatmi, 2017). As the world's social language, English is not only a global communication medium, English is also an academic need whose mastery is in the language aspect.

Beside of being a means of communication with foreign language, actually, learning English can also provide other benefits. First is academic purpose. It is undeniable that we must learn English from elementary school to college. Indeed, the subject matter becoming a special attention in the education curriculum. Final exam scores are determined by English scores. For students, they are required to study module books in English even though they are not students majoring in English language/literature. Second is carrier development. People who are good at speaking English will certainly provide more value for prospective job applicants. They will be seen more in the competition. So that, by having good English they will have more opportunity to get jobs, can compete in the working and can get promotion faster than others. Third is a great chance to go overseas. There are many institutions providing scholarships to study abroad for Indonesian students. One of the requirements is the TOEFL test (Putra, 2020). This test measures how well someone can speak in English. Absolutely, someone has to be proficient in English in order to pass this test.

As one of the most widely spoken languages in the world, mastering English

well will make it easier to understand the instructions given on the transportation, the available schedules, asking for help in an emergency, and reading directions on the road. Apart from that, by mastering English, it will be easy to learn the local customs and culture of the locals. It also broadens horizons and ways of thinking by learning new cultures. Even though the countries may not use English, it can bridge the language for the communication. Therefore, mastering English and being able to use the language proficiently will make travel a memorable and interesting experience (Safura & Helmanda, 2020).

Seeing this condition or phenomenon, universities as the front gate try to overcome the problem. There some policies produced by the Universities to make the English become familiar into the universities zone such as curriculum, inviting the native speakers, English zones, etc. it is expected that the universities society will be familiar with English and can implement it in the teaching and learning process or academic zones.

First is related to curriculum. The universities manage the English as required course, elective course and international class. As the required course, every student must take the English course for two semesters. For the first semester, the students will study about general English, and on the second semester, the students will study about English for specific purpose. So by having two semesters, it is expected that the students could be familiar with English and implement it in their daily activities. Second way is by inviting the native speakers in the universities. The native speakers are invited to teach in the classroom for both students and lecturers. The purpose is the participants will be motivated and forced to study English and the result is the participants could familiarize the English faster. Then, the unique way is by creating some English

zones in the universities. It is also like the English corner where English is used in the certain places. There, the only communication is by using English. It is not allowed to speak with another language. During staying on the place, people only talk in English for every topic given. In addition, in the level of department and study program, English itself is also considered as the important course both for the lecturers and students, so that it is more elaborated into some implementation such English reading, English teaching and learning, English zone, English writing, etc. Finally, English has been a normal or familiar thing in the department or study program atmosphere.

There are some problems occurred during teaching and learning process especially outside of English Department or English study program. Firstly, the lecturers must teach the courses using English both speaking and writing. The lecturers must absolutely be able to master the English for their courses. Second, the students also must master the English in order to comprehend the theories and lessons given by the lecturers for every meeting. By having the condition on the classroom, it is normal that the errors or mistake happen during the learning process. It can be in the form of reading, speaking, listening or even writing. Mistake is a problem occurred in a matter of reading, speaking, listening or writing implemented by students during their learning. Meanwhile, error means that a repeated mistake implemented by the students during their learning.

Writing is one of the skills that must be mastered by the students. It is related to the words, phrases, clauses and sentences. Not only those points, the students also should also study about the diction or vocabulary and grammar of the language. In the writing process, the students must consider many things before producing the

sentences. It is because having a mistake for writing will affect the meaning of the sentences. Then, if the meaning is unclear, people will misunderstand about the meaning of the sentences. (Purnamasari et al., 2021). Actually in English, General English (GE) and English for Specific Purpose (ESP) are two different things. Learning GE means that the students will study about English as general or in other words for daily usage or activities. Meanwhile, ESP means that the students will study about certain subject or course delivered in English. Although these two terms are like similar, but it has different thing in many parts such as topics, terms, and diction (Juliana & Juliani, 2020).

One of the ESP samples is English for Mathematics. English for Mathematics is one of the required courses studied by the student in universities. This course teaches the students using the English for delivering the lesson plan. Since the beginning of the teaching, the lecturers are required to use their English for the students in a matter of topic, assignment, task or projects. So that, the only communication occur in the classroom is by using English. The students could understand about English for mathematics in words, phrases, clauses and sentences. Mathematical operation is one of the topics given on English for mathematics course. This topic will guide the students on how to read the numbers, how to multiply, how to add and subtract the numbers, decimal and fraction. Every student is given the task or assignment to write in English on how the operation is. They must also understand the specific terms and also the grammar for the operation before writing or submitting the task or assignments.

Actually there had been some studies investigating about the English mathematical teaching and learning. A research was about investigating student mathematics learning difficulties in Tibet. It investigated the types

and frequency of errors made in mathematics tasks by Tibetan seventh-grade students through eight different error types: visual-spatial, comprehension, transformation, relevance, fact, procedural, measurement, and presentation. The research shows that the most frequent error types were fact and comprehension errors. Compared to the boys in the study, the girls seemed to be more vulnerable to fact and relevance errors. The students in the rural school made more comprehension errors compared to the students in the urban school (Rong & Mononen, 2022)

Another research was conducted by employing an experimental design to investigate the effects of linguistic complexity and mathematics difficulty on word problem solving by middle school English Learners. The research shows that linguistic complexity has a significant influence on students' perceptions of the mathematical difficulty of the problems. The results are consistent with recent suggestions that English Learners' lower performance in math reflects the additional cognitive demands associated with text comprehension (Barbu & Beal, 2010) Then, the last research was about students' errors on fraction problems, especially in fraction counting operations. The research investigated about students' errors in the fraction counting operation problem related to converting mixed fractions to ordinary fractions, determining fractions of value, and performing fraction addition and subtraction operations. The research shows that majority of students experience about concept errors on each indicator requested on the research. Students make other mistakes such as mistakes of principle and carelessness on fraction counting operations. (wirda Safriani, Said munzir, M.Duskri, 2019)

Based on previous research results, there is a gap in a research about

mathematical operation. This research is focused on English mathematical operation in addition, subtraction, multiplication and division on college students. Those components are considered important to analyze because it becomes the basic calculation of conducting the mathematical operation. Those components are also used to make some patterns or theories of analyzing the mathematical operations. Based on the problem, the research aims to identify and explain about some students mistake on writing the English mathematical operations in higher education in West Sumatera.

METHOD

This study aims to describe the mistakes of the student mathematics study program at Universitas PGRI Sumatera Barat on the mistake for writing the addition, subtraction, multiplication and division with a qualitative descriptive approach. Qualitative descriptive approach means that a research to explore or photograph social situations to be studied thoroughly, broadly and deeply. It also explains that descriptive research qualitative aims to describe, describe, explain, explain and answer in more detail the problem which will be researched by studying as much as possible an individual, a group or an event (Nurmalasari & Erdiantoro, 2020) (Subandi, 2011).

Data collection techniques are conducted by observations, interviews, and documentation studies (Prasanti, 2018). To analyze the students' mistakes in solving problems, the researcher used a test. The test consists of 10 items about addition, subtraction, multiplication and division. The research also used interview in order to find out what problems making the students into mistakes. The interview is conducted with 15 students after seeing their test result. Based on the students' answers, the students

who answered incorrectly would be grouped according to the type of mistake, which then led to an interview on the selected subject that was conducted based on the interview. The interview was conducted as a form of methodological triangulation to ensure the reliability of the data. The research used total sampling. It is because the numbers of participant are small number. The sample in this study was to 70 students studying the English for mathematics 2020 A and 2020 B. This research was conducted on November to December 1st – 20th 2020. The research instruments were test and interview sheet.

The type of student error consisting of (1) incomplete answers, (2) data misuse, (3) technical errors, (4) errors in understanding the previous material, (5) language misinterpretation, (6) theorems and definitions misuse, and (7) unverified solutions. Errors in the forms of incomplete answers refer to questions that are answered but do not have all the solutions and do not provide the conclusions required by the problems (wirda Safriani, Said munzir, M.Duskri, 2019).

The indicators of data misuse include (a) using data from unstated information, (b) ignoring some data needed to find a solution and adding irrelevant data, (c) stating explicitly (e.g. “must be proven”, “found”, “calculated”) as a requirement when not needed in problem solving, (d) specifying certain inconsistent information (e.g. using the height of a triangle to solve problems about the median), (e) using terms that do not match the information provided, and (f) using the numeric value of one variable for another variable. Technical errors include calculation errors, errors in extracting data from tables, errors in manipulating basic algebraic symbols, and other errors in writing algorithms. Then, as the name suggests, errors in understanding previous material occur due to not understanding the

concept of the previous material. Language misinterpretation refers to mathematical errors that are related to the translation of mathematical facts described into other possible languages. The indicators of this error are (a) translating natural language into mathematical terms or equations that are not appropriate from the explanations given, (b) designing a mathematical concept with symbols of other mathematical concepts, and (c) misinterpreting the graph into mathematical terms or vice versa.

Theorems and definitions misuse refers to errors in the use of principles, rules, theorems, and definitions, such as (a) using theorem not under appropriate conditions, (b) applying the distributive property to nonconforming operations, and (c) citing inaccurate definitions, theorems, and formulas. Finally, errors related to unverified solutions is indicated by the final result that is not a solution to the stated problem even though the steps conducted in answering the questions are correct. This is due to the fact that students do not re-examine or verify the solutions that have been made. Data analysis was performed by using data reduction, data display, and conclusion drawing or verification. The data from the test and interview firstly went through data reduction in which the information were processed and reduced in order to have the needed, important data related to the students’ errors in answering math problems. Then, the data were classified or categorized in the data display procedure, which were then drawn to a conclusion in the conclusion drawing stage.

RESULTS AND DISCUSSION

Research Results

A. Analysis of the Student Error in Writing the English Mathematical Operation for Addition

Students were asked to write down the English mathematical operation from the

above questions. After collecting the answers, the researchers find some errors on

doing the addition mathematical operation

No	Questions	Student Answers	Correct Answer
1	$7 + 2 =$	<i>Seven plus tow equal nine</i> <i>Seven plus too equal nine</i> <i>Seven added two is nine</i> <i>Seven plus two equal nine</i>	<i>Seven plus two is equal to/equals/ is 9</i>
2	$15 + 9 =$	<i>Fiveteen pluss nine equal twenty for</i> <i>Fiften plus nine equal twenny four</i> <i>Fifteen plus ninee equal twent four</i> <i>Fifeteen pluss nine equal twentyfour</i>	<i>Fifteen plus nine is equal to/equals/is twenty four</i>
3	$102 + 23 =$	<i>Onehunders two plus twenty third is onehundred twentyfive</i> <i>One hundreds plus twenny thre is one hundred twenty fife</i> <i>One hundred second plus twenty third equal one hundred two five</i>	<i>One Hundred two plus twenty three is equal to/equals/ is one hundred twenty five</i>

Table 1. Student Error in Writing the English Mathematical Operation for Addition

Based on the data above, it can be seen some errors found on the student's answers. First is some students had errors in incomplete answers. Based on the answers sheet, it is found that most of the students had errors in incomplete answers. Some students did not answer the question items for one or two items of addition. Error in technical error is also found on the student answers such as error in numbers, and error in calculation. There is also an error in understanding of previous materials. It shows that the student just mix the cardinal and ordinal number in mathematics. Language misinterpretation error also occurred on the student test. Some students

could not differentiate the numbers or use the correct number for the English mathematical operations. The students could not write the English mathematical operation well. The sample of errors could be seen on the words such as *tow*, *equal*, *added*, *equal*, *fiveteen*, *fifeteen*, *nine*, *twentyfour*, *twenny*, *onhunders*, *onehundred*, *fife*, *third*, and *thre*.

Analysis of the Student Error in Writing the English Mathematical Operation for Subtraction

Here are the samples of the data collection from the subtraction as the following:

No	Question Items	Student Answers	Correct Answer
1	50 - 12 =	<p><i>Fivety minus twelve equal thirsty eight</i></p> <p><i>Fifety minus twelve equal thirty eight</i></p> <p><i>Fifety minus twelve equal thirty eight</i></p> <p><i>Fiveteen minus twelve equal thersty eight</i></p>	<i>Fifty minus twelve two is equal to/equals/ is thirty eight</i>
2	38 - 4 =	<p><i>Thirsty eight minus for is thirsty for</i></p> <p><i>Thersty eight minus for equal thersty for</i></p> <p><i>Therty eight minus for is therty for</i></p> <p><i>Thirty eigh minus for is thirty fours</i></p>	<i>Thirty eight minus four is equal to/equals/ is thirty four</i>
3	99 - 22 =	<p><i>Nineteen nine minus twenty second minus seventeen seven</i></p> <p><i>Ninty nine minus twenty second minus seventeen seven</i></p> <p><i>Ninetieth nine minus twenty second minus seventieth seven</i></p>	<i>Ninety nine minus twenty two is equal to/equals/ is thirty seventy seven</i>

Table.2. Student Error in Writing the English Mathematical Operation for Subtraction

Based on the data above, it is seen some errors found on the student's answers. First is some students had errors in incomplete answers. It is found that most of the students had errors in incomplete answers. Some students did not answer the question items for one or two items of subtraction. Error in technical error is also found on the student answers such as error

in numbers, and error in calculation. There is also an error in understanding of previous materials. It shows that the student just mix the cardinal and ordinal number in mathematics. Language misinterpretation error also occurred on the test. Some students could not differentiate the numbers or use the correct number for the English mathematical operations. The errors are like:

fifty, fivety, fiveteen, thirsty, thirty, equal, thersty, thirty, eigh, for, fours, is, seventeen, nineteen, ninty, second, seventieth, and ninetieth.

Analysis of the Student Error in Writing the English Mathematical Operation for Multiplication

These are the following data related to the multiplication of English mathematical operation

No	Question Items	Student Answers	Correct Answer
1	8 x 6 =	<i>Eigh times sixs equal fourty eigh</i> <i>Eigt times sex is froty eigt</i> <i>Eights times sixs equals fourty eights</i>	<i>Eight times six is equal to/equals/ is forty eight</i>
2	12 x 2 =	<i>Tweleve times second equal twenny for</i> <i>Twelfth times tow equal twentieth for</i> <i>Twelveteen times two equal twenteen four</i>	<i>Twelve times two is equal to/equals/ is twenty four</i>
3	7 x 4 =	<i>Sefen times for is twentieth eigh</i> <i>Sevens times fours equals twentieth eights</i> <i>Seventeen times for equal twenny eigh</i>	<i>Seven times four is equal to/equals/ is twenty eight</i>

Table 3. Student Error in Writing the English Mathematical Operation for Multiplication

Based on the data above, it is seen some errors found on the student's answers. First is some students had errors in incomplete answers. It is found that most of the students had errors in incomplete answers. Some students did not answer the question items for two items of multiplication. Error in technical error is also found on the student answers such as error in numbers, and error in calculation. There is also an error in understanding of previous materials. It shows that the student just mix the cardinal and ordinal number in mathematics. Language misinterpretation

error also occurred on the test. Some students could not differentiate the numbers or use the correct number for the English mathematical operations. The errors are for examples: *eigh, sixs, fourty, froty, eights, tweleve, twenny, twenteen, twelveteen, sefen, and seventeen.*

Analysis of the Student Error in Writing the English Mathematical Operation for Division

Here are the following data related to the division of English mathematical operation.

No	Question items	Student Answers	Correct Answer
1	$18 : 3 =$	<i>Eighteen divides tree equal sixs</i> <i>Eighten divided there equal six</i> <i>Eighteens divided third equals sixth</i>	<i>Eighteen is divided into three is equal to/equals/ is six</i>
2	$40 : 5 =$	<i>Fourty divided fife is eigh</i> <i>Fourteen divided five equal eights</i> <i>Forteen divided fives equal eighth</i>	<i>Forty is divided into five is equal to/equals/ is eight</i>
3	$72 : 9 =$	<i>Sefen two divided nine is eigh</i> <i>Seventeen tow divided nines eights</i> <i>Seventeen second divided ninth equal eight</i>	<i>Seventy two is divided into nine is equal to/equals/ is eight</i>

Table 4. Student Error in Writing the English Mathematical Operation for Division

Based on the data above, it is seen some errors found on the student's answers. First is some

students had errors in incomplete answers. It is found that most of the students had errors in incomplete answers. Some students did not answer the question items for one items of division. Error in technical error is also found on the student answers such as error in numbers, and error in calculation. There is also an error in understanding of previous materials. It shows that the student just mix the cardinal and ordinal number in mathematics. Language misinterpretation error also occurred on the test. Some students could not differentiate the numbers or use the correct number for the English mathematical

operations. The errors are for examples: *eighteen, divides, tree, sixs, eighteen, eighteens, third, sixth, forty, fife, eigh, fourteen, fourteen, fives, eighth, eights, sefen, tow, and ninth.*

Based on the interview from the selected students, it is found some problems of doing errors on writing English mathematical operation. Firstly, students say that questions items are difficult to answers. It makes the student don't know what to answer on the test. They think that it is still difficult to memorize the English mathematical terms for each questions asked on the test. Those statements are evidenced

by the mistakes found on the student's answer where almost 50 percent of each question has been wrongly-answered by students. The mistakes are spread in the form of addition, subtraction, multiplication and division. Secondly, there are many technical errors happening during the test. It is seen on the student answers where many students make mistake on differentiating between cardinal and ordinal numbers. Thirdly, effect of previous material error also covers the student's error. It shows that the previous material make the student difficult to differentiate between one theory to another theory. It is clearly seen that many of the questions are not answered correctly. The students sometimes are influenced by the previous questions shared to them on the test. Fourthly, language misinterpretation errors happen because the student gets the difficulties to memorize the correct diction of the words and the way to write is also difficult for some students. It is found that many students forgets about to write the correct term of English mathematical operations and some of the sentences are also wrong because it is grammatically incorrect. At last, although they could understand the theories of addition, subtraction, multiplication and division but it is still difficult to differentiate

between one operation to another operation in English mathematical operation.

Discussion

After conducting the research on English mathematical operation writing, it shows that the types of the errors are found on the type of incomplete materials, technical errors, errors in understanding the previous material, and language misinterpretation. Meanwhile, student errors in the type of data misuse, theorems and definition of misuse and also unverified solutions are not found on the research. Based on the research it could be seen that the students could comprehend the text or the questions but to write it in the English mathematical operation makes them difficult to do so. They also understand about what the questions are stated on the information but if they must write it on the answer sheet, it makes them doubt to select the appropriate words or diction to write the operation.

These phenomenon are also supported by the interview where data misuse, theorems and definition of misuse and unverified solutions could not be found on the interview. It is because the student could read and understand the written information from the stating text. Here is the following information about student writing about English mathematical operations.

No	English Mathematical Operation	Types of errors
1	Addition	1. Incomplete answers 2. Technical errors 3. Errors in understanding the previous materials, 4. Language misinterpretation
2	Subtraction	1. Incomplete answers 2. Technical errors 3. Errors in understanding the previous materials, 4. Language misinterpretation
3	Multiplication	1. Incomplete answers 2. Technical errors

		3.Errors in understanding the previous materials,
		4.Language misinterpretation
4	Division	1.Incomplete answers 2. Technical errors 3.Errors in understanding the previous materials, 4.Language misinterpretation

Table 5. Student Error in Writing the English Mathematical Operations

CONCLUSION

English is a language that is well known as the world's international language. Although it is as an international language, in Indonesia, it is generally considered and taught as a foreign language. As a means of global communication, English should be actively mastered both orally and in writing. English itself is also considered as the important course both for the lecturers and students, so that it is more elaborated into some implementation such English reading, English teaching and learning, English zone, English writing, etc. Finally, English has been a normal or familiar thing in the department or study program atmosphere. Writing is one of the skills that must be mastered by the students. It is related to the words, phrases, clauses and sentences. Not only should those points, the students also study about the diction or vocabulary and grammar of the language. In the writing process, the students must consider many things before producing the sentences. It is because having a mistake for writing will affect the meaning of the sentences. Then, if the meaning is unclear, people will misunderstand about the meaning of the sentences.

After conducting the research on English mathematical operation writing, it shows that the types of the errors are found on the type of incomplete materials, technical errors, errors in understanding the previous material, and language misinterpretation. Meanwhile, student errors

in the type of data misuse, theorems and definition of misuse and also unverified solutions are not found on the research. This is research is in line with the current research where there are some students making errors in writing or solving the English mathematical operations, for example: The causes of these errors include limited students' reading comprehension abilities, students have not been able to identify relevant information in story problems, students are not used to working on story problems, poor time management, and students have not mastered mathematics, needed to solve operational problems properly (Fitri et al., 2022) and These errors may be due to lack of fundamental knowledge in mathematical operations. Thus the concepts in fundamental operations should be exercised in the minds of students (Chamundeswari, 2014).

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