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WHAT KIND OF MATHEMATICS FOR *DOORSMEER STUDENT* FITS FOR IN SOLVING A MATHEMATICAL PROBLEM: A DISCUSSION ABOUT STUDENT'S INFORMAL MATHEMATICS

JENIS MATEMATIKA YANG SESUAI BAGI SISWA YANG BEKERJA DI DOORSMEER DALAM MENYELESAIKAN MASALAH MATEMATIS: SEBUAH DISKUSI TENTANG MATEMATIKA INFORMAL SISWA

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Abstrak: Penelitian ini bertujuan untuk mengidentifikasi matematika informal siswa dan cara guru dalam menyelesaikan masalah matematika informal tersebut. Penelitian ini melibatkan 5 orang guru dan 1 orang siswa yang bekerja pada perusahaan pencuci sepeda motor. Sebagai gambaran, matematika seorang pekerja (siswa) *doorsmeer* (pekerjaannya mencuci motor), yang dianggap sebagai jenis matematika di luar sekolah (matematika informal) bisa menyelesaikan masalah matematika siswa yang terkait dengan kegiatan keseharian siswa yang bekerja pada tempat *doorsmeer*. Akan tetapi, matematika formal yang digunakan oleh guru dan yang diajarkan di sekolah, tidak bisa menyelesaikan masalah yang sesuai dengan realita yang dihadapi siswa *doorsmeer*, walaupun algoritmanya sudah benar. Sebagai kesimpulan, guru matematika mengira bahwa matematika yang dipelajari di sekolah sudah cocok untuk siswa yang bekerja di *doorsmeer* dengan kata lain, matematika yang diberikan di sekolah bisa aplikasikan di tempat siswa bekerja. Akan tetapi, cara matematika yang diaplikasikan oleh siswa *doorsmeer* tidak sama dengan matematika yang diajarkan oleh guru di sekolah yang berpikir bahwa matematika sekolah cocok di tempat siswa bekerja.

Kata Kunci: *Matematika Informal, Matematika Formal, Etnomatematika, Siswa Doorsmeer, Masalah Matematis*

Abstract: *This research aims to identify student's informal mathematics and how teachers' response toward it. This research involved 5 (five) teachers in Junior high school and 1 (one) student in Junior high school who work in doorsmeer company (washing motorbike company). For example, in this research, a doorsmeer student (working for washing motorbike) mathematics, which is considered out of school mathematics (informal mathematics), can solve a daily mathematical problem. However, formal mathematics, which uses by teachers, cannot reach reality solution for the student, even the algorithm is correct. In conclusion, mathematics teachers' thought that mathematics at school fits for doorsmeer student which means it can be applied in the work of doorsmeer company. However, the way how mathematics by doorsmeer student implemented is not the same of mathematics that teachers' tough fits for the students*

Keywords*: Informal Mathematics, Formal Mathematics, Ethnomathematics, Doorsmeer Student, Mathematical Problem*

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It is common sense that students already interact with formal mathematics since elementary school, and they have several years to learn about what formal mathematics is. Although, students do not realize that what they have learned is formal mathematics which identical with rigorous logic, culture free. Then, why international assessment ends up with there is many developing countries perform low mathematics of the evaluation, in advance what student have learned in school then? Can they not use it? One of the reasons is that many aspects of mathematics did not match with their career in the future (NCTM, 2014; Tunstall & Ferkany, 2017). For example, student who good at counting in market when they face the problem in formal structure, they will be fail to answer it (Carraher et al., 1993). Therefore, there is a need for a complementary perspective to assess the problems.

The whole questions above argue the need for mathematics to be understood concerning culture, social, and politics is inventible (Carraher et al., 1993; D'Ambrosio, 2001; Mamolo, 2018; Walshaw, 2014). As a result, mathematics will be different as well depend on what kind of perspective do, we have. In these points of view, at least there are two characteristics of mathematics. Firstly, mathematics always has a different meaning than its formal perspective, which is absolute, pure, and rigorous. the second one, a person who is doing mathematics, is geeks (Gadanidis, 2012). However, regarding cultural perspective toward mathematics, it already emerged within students or people unconsciously through six universal mathematical activities, which are counting, locating, measuring, designing, playing, and explaining by Bishop in Putra (Putra, 2020). Besides, concerning mathematics in the social term, mathematics has alternative algorithm to solve a problem like how to give pocket money to each of children reasonably, besides the grade of children is vary and the use of formal mathematics seem to be unfit in this condition, slightly alternative algorithm (Morgan, 2014). Also, it could be a combination of two perspectives, such as the socio-political area in mathematics, which focuses on the role of mathematics itself in society, and critical inspiration point of view by *Ole Skovsmose* (Alrø et al., 2010). Even though some researchers argue that Frankenstein is the first one who initiated the term of critical mathematics education (Pais et al., 2012), but putting technology as megastructures of society in mathematics education is an essential initiation (Clements & Sarama, 2016; Novita & Herman, 2021; Skovsmose, 1994). Therefore, considering the perspective of mathematics, the classroom learning process is utterly diverse, which means the enforcement of using traditional mathematics is not the best solution for better mathematics education (Philipp, 1996).

Moreover, because of the different perspectives of mathematics, then there is also a possibility that teacher's mathematics and student's mathematics are contradicting each other's. On the one hand, the teacher's mathematics is the traditional one who considers algorithms differentiated from concrete knowledge. Of course, it neglects an alternative algorithm that is tedious and ineffective. On the other hand, student's mathematics is considered too primitive and already develop from generation to generation until it concludes that mathematics in the sense of daily life is not mathematics. Therefore, it is crucial to realize that mathematics is not merely universal for people unless they share

the same cultural background (Orey & Rosa, 2008)

Furthermore, (Hottinger, 2016), in his book titled *Inventing the Mathematician*, also strengthens the role of cultural understanding in creating the diversity of mathematics. Besides, mathematics is not merely happening because of the practice of mathematics itself. Instead of culture also put emphasize what kind of mathematics that suit to their society. Concerning these issues, then do mathematics teachers realize the problem? How pre-service teachers react to such kind of the same issue since they are future mathematics teachers who also need more simulation (real example) to know how daily life problem solving (Cetinkaya et al., 2016)? Can we blame students' low performance in mathematics because of their cognitive ability in grasping insight?

Therefore, from several problems above, it does not make sense in the praxis of teachers now, where teachers only focus on performance; in fact, they did not pay much attention to how mathematics teacher's tradition develops a proper curriculum freely (Braathe, 2015). Furthermore, the teacher, as a role model in the class, cannot rely on mathematics that they have based on a university perspective. Hence, the need to understand mathematics from the socio-cultural aspect could be a complementary solution for solving mathematics problems. Therefore, one of the many ways that fulfill this need is bringing ethnomathematics as an approach to tackle both cognitive (performance) and affective in a mathematics problem. However, what kind of ethnomathematics that can address the issues since ethnomathematics has a significant tendency to evolve in the future? (D'Ambrosio, 2016). What would be mathematics in the classroom look like if three dominant perspectives were in the class?

As a result, before heading to solve the problems above, confirming and explaining about what teacher thought about mathematics that already possessed for students and their responses toward student's mathematics is the preliminary way to achieve the goal. and it believes that teachers' thought focus on their perspectives toward mathematics as mathematics what teachers acquired since in the university. Hence, describing the issue is also formidable since teachers can understand the way how mathematics being used by students in their daily life

The terms for ethnomathematics (D'Ambrosio, 1985; Gerdes, 1994; Horsthemke, 2006; Orey & Rosa, 2008; Putra, 2018; Rogers, 2015) informal and formal mathematics have become researchers concerns since the terms of *mathematics* and mathematics itself were used differently. The differences happen because of different lenses or point of view that they use in using mathematics. Then, it raises fundamental issues about what is mathematics exactly? (Culligan & Wagner, 2018; Fellus & Glanfield, 2019; Reuben Hersh, 2001).

Indeed, there is also the researcher stated that ethnomathematics is about informal mathematics, which was found in students' daily life or society; in this case, the term of non-academic mathematics was used. Also, the kind of mathematics that they used differ from formal mathematics or academic mathematics (Palmer, 2010). It means that there is only informal and formal mathematics. However, this research considers ethnomathematics, informal, and formal mathematics; they are different. Hence Putra (Putra, 2018) tried to use personification to show their differences. How are they different

then? As mentioned in Putra (Putra, 2018), For some reason, formal mathematics sometimes did not fulfil the need of learners in daily life. Some learners were doing good in the street about counting, but they fail in mathematics at school. One of the reasons is that informal mathematics develops through daily life experiences, and it happens sometimes spontaneously (Namkung et al., 2019). This research closely related to Tomaz and David (Tomaz & David, 2018) already used an artifact for making the representation in learning mathematics although, it depends on communicational artifacts that students register to operate in mathematics education course. Of course, depending on informal mathematics only, it is not the best choice as society keeps moving forward. It will lead to enforcements method in acquiring formal mathematics since students will need mathematics badly in the future. Although not all students want to be an engineer or scientists. Therefore, bridging both formal and informal mathematics is essential. The kind of bridge described here is the ethnomathematics.

Beside Putra (2018), Tomaz & David (2018) already used an artifact for making the representation in learning mathematics. It is depend on communicational artifacts that students register to operate in mathematics education course.

Methods

It is descriptive qualitative research (Creswell & Creswell, 2018). This research was conducted in June 2019 until April 2020. There are several participants who happily join this study. Those participants are a student and teachers. One student who work in *doorsmeer* company and he still in grade VIII junior high school was interviewed. and five teachers from two different school in Banda Aceh also contributing as the data resources. In this study, an unstructured interview becomes the instrument (Creswell, 2012)to gain primary data about how *doorsmeer students* applied his mathematics. Afterwards, the data from student's answer in the interview was converting into a mathematical problem. Then, the designed mathematical problem from student interview become the context or topic discussion in teachers' FGD (Focus Group Discussion). It aims to explore teachers' way of thinking in solving student's daily life problem (informal mathematics). Therefore, the focus group discussion become the second necessary procedure to describe the information about how mathematics teachers respond to a mathematical problem faced by their student.

Based on the description above to gain data credibility from the teachers about their response toward, data triangulation was conducted. In this research, source triangulation was conducted by taking several teachers in Junior High School to respond mathematical problem that had been faced by a *doorsmeer* student. If there is consistency among teachers answer, then the data is credible.

Result and Discussion

Result

Before starting the discussion, *doorsmeer student* means a student who works in a company which aims to wash motorbikes. The discussion begins through a conversation with the *doorsmeer* boy in secondary school students. Then, the conversation converted into a mathematics problem as the focus group discussion for in-service and pre-service teachers to assess their answer in solving the

same problem as the *doorsmeer* boy faces. The following conversation shows how the student worker was feeling about learning mathematics in his actual class. In the discussion, *R* is a researcher, and *S* is a student who works at the *doorsmeer* company.

R1: Do you like mathematics?
S2: No, I cannot think about that.
R3: You cannot think about mathematics?
S4: Whenever the mathematics subject started, directly, I feel so sleepy.
R5: Why you feel so sleepy, is that because of the teacher as well?
S6: No, not because of the teacher; indeed, it because I do not like

(Dialog between student worker and researcher)

Based on the conversation above, the reason he feels mathematics is awkward is not about the teacher as the one who delivers the message of mathematics but himself who does not have much motivation to learn about mathematics (*S6*). The result of less motivation for learning mathematics is feeling to sleep in the class (*S4*). Regarding the issue, some previous study also confirms that motivation also plays an essential role in the student's learning process since it will affect students' performance and trigger their willingness to learn mathematics. For example, (Marcelina et al., 2017) agreed that motivation is one of three critical aspects that will influence the result of learning mathematics. Their research shows a linear change in terms of motivation and students' performance in mathematics. Moreover, (Waege, 2010) also agreed that motivation to learn mathematics could appear because of student understands the need and goal of learning mathematics. Therefore, proposing a framework to analyze students' motivation for mathematics learning is crucial.

Even though some previous research shows how vital motivation is, students' responses to this study also show weak motivation in learning. However, it does not conclude that the student cannot apply mathematics in his daily life. The following conversation shows us how a student who works in a washing motorbike company used his mathematics for sustainability. The next discussion is about student's mathematics in his daily life while he was working on washing a motorbike.

R9: So how much money for washing a motorbike? For example, the big one that you just washed.
S10: 20 (he aims to say twenty thousand rupiahs)
R11: 20 (my confirmation), what about the small one? Like my motorbike?
S12: 13 (he aims to say 13000 rupiahs)
R13: So, thirteen right (I also intend to say 13000 rupiahs) means that the difference is seven thousand rupiahs?
S14: He was nodding
R15: How much the owner pays you for each motorbike?
S16: Usually, we divide into two each of us.
R17: You share between you and the owner?
S18: For example, such as today, I wash four big motorbikes, then I got 40 (he aims to say forty thousand rupiahs)
R19: Oooo, if the big motorcycle you wash cash you twenty, how much you get?
S20: 10000 rupiah for each of us.
R21: Oooo, ten thousand rupiahs each of you, so you share 50-50 directly, right?
S22: He nodded
R23: So, what about 13000 rupiahs in case of a small motorbike? It 13000 rupiah right, you much you get since it is hard to share precisely in the same amount of money. (Note, in Aceh daily life, it is taboo for sharing one

thousand rupiah since one thousand rupiah even cannot use to buy a cup of Aceh's coffee)

S24: I got seven thousand rupiah

R25: 7000? (confirmation), then six thousand rupiahs for the owner? You got higher than the owner.

S26: He nodded

R27: Then, which one you like to wash most? Big one or a small one?

S28: It is hard to decide; however, in the effortless way to wash, I prefer to wash not too dirty motorbike.

R29: Oooo. I see.

S30: However, in case both exactly too dirty, after some calculation, we got the same amount of money.

(Dialog between student worker and researcher)

Based on the conversation above, the student can apply mathematical knowledge that already known for a long time, probably. However, it seems that he did not realize what he previously communicated with which that is mathematics. It based on what the conversation at the first starting point began, which he said that he did not like mathematics. Furthermore, in *S30* of the interview, it shows how he deals with the calculation for decision-making; even after doing some other calculation that I do not know, he ends up with the same amount of money whether he washes small or big motorbikes. Therefore, at this sense, it proves that ethnomathematics and critical mathematics education, in terms of social perspective, they have the same view toward mathematics which is mathematics itself in the different social area will be different (Pais et al., 2012). For example, in *S30*, if he provides mathematics as it is, then it will be impossible by calculating the money from washing small motorbike and big motorbike, the amount of money that he gets will be the same.

Later, the *doorsmeer student* does not want to choose; then, the researcher stimulates him with an interpretation. The following conversation continues.

R31: I see, but for me, I will wash the small motorbike.

S32: Of course, that is correct. We wash the big one; we are afraid to handle the motorbike because the motorbike is too heavy. If we fall the motorcycle, that would be heavy (He uses a metaphor) on us. (At this rate, he tries to figure out my answer)

R33: But for me, do you know why I choose the small one, it is because when we share the money, we receive one thousand rupiah more than the owner. From 13000 rupiah, you got seven thousand rupiahs, of course, you got an enormous amount of money, right? Nevertheless, if you wash the big one, you got 10-10, equal sharing. So, which one do you like now, do you still with your first choice? Or would you like to wash the small motorbike?

S34: Brother, if you know the secret of how to wash a big motorbike, of course, you would like to choose the big one.

R35: So, you still with your answer, which is choosing the big one.

S36: In case of washing a big motorbike, the most critical key is water pressure. As long as you got intense water pressure, then all kinds of dirty things from big motorcycles will fall. Even though you give intense water pressure in small motorbike, it is hard to reach the small segment of a motorbike, which means making your work double.

(Dialog between student worker and researcher)

From the conversation, especially *S36*, I can conclude that it is not about how much money does he has in washing the motorbikes, instead of saving the stamina as much as he can is his focus. In other words, it is not about how big money that he has, but the uncomplicated way to finish the job. This finding will be compared with five teachers who participated in a Focus Group Discussion.

After analyzing the conversation between *the doorsmeer student* and the researcher, then the researcher converts the conversation to become a mathematical problem, and this problem becomes the issue in the Focus Group Discussion (FGD). The following statement is the precise problem from the conversation summary.

If you are a person who works in washing motorbike company, which one of the following conditions will be your first choice to do:

a. You wash big motorbikes for twenty thousand rupiahs for each; then, you get ten thousand rupiahs for each as your wage.

b. You wash small motorbike for 13000 rupiahs for each; then, you get seven thousand rupiahs for each as your wage.

The next conversation is about focus group discussion among three pre-service teachers and two in-service teachers. In the focus group discussion, the following mathematical problem was designed based on the previous conversation. In the next discussion, *R* is *the researcher*, *Xa* is *pre-service Teacher 1*, *Xb* is *pre-service Teacher 2*, *Xc* is *pre-service Teacher 3*, *Xd* is *in-service Teacher 1*, and *Xe* is *in-service Teacher 2*.

1.1. Pre-service teacher 1's Answer (Xa)

The following conversation shows *Xa*'s response to the problem.

R37: What do you think, Xa?
Xa38: I choice two?
R39: Why your choice two?
Xa40: It is because many people use a small motorbike, thus possibly getting more guests. Even though we got a little money, which is seven thousand rupiah, but we have many motorbikes that we can wash. Hence, we can earn more money compared to wash big motorbike which few people use it.
R41: So, the reason because many people use small motorbike right. Ok then. What about you, Xb?

(Dialog between pre-service teacher and researcher)

Based on the conversation above, *Xa* chooses to wash a small motorbike with the experience that many people use small motorbike (*Xa40*), which means that the opportunity to wash a small motorbike is significant, which then lead to multiplying seven thousand rupiahs with how many small motorcycles that she washed. Also, *Xa*'s focus is the amount of money, which is seven thousand.

1.2. Pre-service teacher 2's Answer (Xb)

The following conversation shows *Xb*'s response to the problem.

R41: What about you, Xb?
Xb42: For me, I will choose number 1.
R43: Why number 1?
Xb44: Number 1 is for a big motorbike right, then I will earn big money compared to wash a small motorbike. However, as long as we make big money, it is ok if we are tired.
R45: I see, what if the condition of 13000 rupiahs, there is always a friendly customer who gives more money 15000 rupiahs for washing small motorbike, will your choice number 2?

Xa, Xb, and Xc46: Of course, we will choose number 2.

(Dialog between pre-service teacher and researcher)

Based on the conversation above, *Xb* chooses to wash a big motorbike because she gets a more significant amount of money than clean a small motorbike. Besides, as long as she earns big money, it is normal if she feels tired, and it leads to the conclusion that *Xb*'s foci are the amount of money, which is ten thousand (number) and feeling tired of earning much money as usual.

1.3. Pre-service Teacher 3's Answer (Xc)

The following conversation shows *Xc*'s response to the problem.

R47: So, what about you, Xc?

Xc48: As you say, if many good guys who give 15000 rupiahs for washing small motorbike and I can get nine thousand rupiahs, then I choose number 2 because we earn an additional two thousand rupiah.

R49: However, the condition is not like that, so Xc, which one your choice?

Xc50: I will choose number 1 because of 50%-50%. If one big motorbike for twenty thousand rupiahs, then we got ten thousand rupiahs.

R51: Oooo, the reason almost the same then.

(Dialog between pre-service teacher and researcher)

Considering the conversation above, *Xc* still in-depth thinking about the condition if many good guys to give three thousand more rupiahs to wash then almost all teachers prefer to wash the small one. Unfortunately, the situation is not always like that, then *Xc* chooses to wash big one because of equal sharing (*Xc50*), which is 50%-50%, and she gets the money more significant, which is ten thousand rupiah. Therefore, the conclusion is that the amount of money is her focus.

1.4. In-service Teacher 1's Answer (Xd)

The following conversation mainly shows *Xd*'s answer related to the problem.

R51: What about you, Xd?

Xd52: Eemmm, for me, it would be number 2.

R53: Your choice is number 2, is the reason the same as Xb?

Xd54: No, in case of washing the motorbike is not easy work, the more side in the motorbike, the more challenging to wash cleanly. Therefore, I choose number 2 because small motorbikes are not too tricky to wash. Even if we multiply by the total small motorbike that we wash a day, of course, it will overcome the profit of washing a big motorbike.

Xb55: Even one-and-a-half of the wage from washing a small motorbike is the same as washing one big motorbike.

Xd56: Yes,

R57: It means, we back to the comparison right.

Xb, Xd58: Yes,

Xd59: Moreover, the differences are not significant; it is not Significant.

R60: For us, it is not a significant difference, but it is a significant difference for a student.

Xa, Xb, Xc, Xd, Xe61: Yes, indeed

R62: How now, probably their pocket money is five thousand rupiah a day. How big the percentage of three thousand rupiahs from five thousand rupiahs?

Xa, Xb, Xc, Xd, Xe63: Yes (some of them only nodding)

(Dialog between pre-service teacher and researcher)

In-service Teacher 1 prefer to wash a small motorbike (*Xd52*) since it is not difficult to

wash and also the difference amount of money between washing small and big motorbike is not too big. Even she also agrees with the argumentation that one and half of the wage from washing a small motorbike are the same as to wash one big motorbike. Take a look at her reason; it does not make sense in terms of applying formal mathematics in the case of *doorsmeer students*. It will be impossible to get wages one and half of washing the motorbike since there is no option to wash the motorbike by a half. Again, in this condition, do we have to force formal mathematics in such kind of this situation. Do they think mathematics that they deemed fit for *doorsmeer students* at school? However, regarding the answer that she gave almost the same with all pre-service teachers, which focus on the amount of money, even though somehow easiness also becomes her consideration (*Xd54*), it contradicts with student's statement, that big motorbike is more comfortable to wash (*S34*). Furthermore, this conversation revealed that the sense of money between teachers and students also different. For teachers, five thousand rupiah is a small amount of money, but for a student, it more than half of their pocket money to go to school, which means it is a significant amount of money.

1.5. In-service Teacher 2's Answer (Xe)

The following conversation will focus on *Xe*'s answer concerning the problem.

Xd64: However, I believe if he is a student, He choices number 1 because he can earn more money. (Seem that her answer contradicts with the initial response).

Xe65: The core information is earning more money. (She tries to understand Xd's point of view)

R66: Ok, what about you, Xe?

Xe67: For me, eeeee, I tend to choose number 2 as well.

R68: Why is your choice number 2?

Xe69: Because we can handle all the staff by ourselves. Usually, when a customer comes to doorsmeer, their motorbikes, all the responsibility belongs to the washer. If we wash a big motorbike, we cannot handle it with one person.

(Dialog between pre-service teacher and researcher)

Based on the conversation above, it reveals that in-service Teacher 2 prefers to wash a small motorbike since the risk of falling is small because a big motor is hefty and hard to control (*Xe69*). Besides, she also concerns about money because she responds to *Xd*'s statement, even though she did not agree with her option (*Xe65*). Unfortunately, involving money, there is no precise statement about her reason.

Discussion

After hearing their answer toward the problem, then finally we come to understand directly about student answer related to the problem and after hearing the conversation between researcher and *doorsmeer student*, then the following final discussion's transcription as follows:

R72: All right, after hearing directly toward my discussion with the doorsmeer student, his answer is number 1, but the reason is strange. What do you think?

Xe73: Because 10000 rupiah is more significant than seven thousand (she tries to guess the answer)

R74: It could be, but let us hear the answer part one more time.

In the middle, I tried to rewind X5 says as follows.

Xe75: You should interview the girl student who works in the doorsmeer because the one who participates in today's discussion are girls.

R76: You are very right, but you are a teacher who teaches not the only girl at school, but also boys right. It means we also need to understand the boy student's thinking. So now, let us hear one more time.

After rewinding the record.

Xb77: It is because of his experience in washing the motorbike; for him, it is effortless to wash a big motorbike. Water pressure is the key.

After Xb's answer, the other also realize the differences.

(Dialog between pre-service teacher and researcher)

Based on the previous discussions, every in-service teacher and pre-service teachers have their answers related to the problem, and all their solutions precisely not the same with the student's answer. Most teachers focus on the amount of money concerning the answer to a mathematical problem, which in student case, he does not emphasize money. It also shows how teacher response to the mathematical problem focuses on how to solve the problem using formal mathematics that they thought *doorsmeer student* is also doing the same thing. Most of the teacher's answer does not make a sense in solving the mathematical problem in the student's mathematics perspective. For example, in the case of *S30* from researcher and student conversation, if he provides mathematics as it is, then it will be impossible by calculating the money from washing small motorbike and big motorbike, the amount of money that he gets will be the same. Another one is the case of *Xd*, which stated: "*even one and half of wage from washing a small motorbike is the same as to wash one big motorbike*."

Moreover, this research also reveals that not all informal mathematics can be interpreted in formal mathematics. Because informal mathematics, to some extent too much influenced by the environment, including culture and social. Thus, this condition leads to the teacher's misinterpretation in solving a mathematical problem that the *doorsmeer student solves*. To go further, if street mathematics that was mentioned by (Carraher et al., 1993) is related to what informal mathematics is, then should we, as educators, formalize the informal mathematics?(Palmer, 2010). It is not an educator's intention to formalize informal mathematics instead of how as educators, they can appreciate informal mathematics in some extended can solve what students in daily life without enforcement of formal mathematics to solve a mathematical problem. It also means educators can use mathematics, whether informal and formal, to appreciate the surrounding culture.

Finally, at the end of the discussion, *Xe* argues that there is a need to interview a girl's student who works in the *doorsmeer* (*Xe75*), so the teacher's answer will not far away from what girl student's response. However, the majority condition in the class consisting of boys and girls, and we need to understand how their thinking about mathematics. It is not because teachers are female then, female's teacher knows better about girl's mathematics. There is no guarantee about that. Moreover, it also shows that gap of knowledge between teachers and student appears which means that there is also a need to make a communication how to overcome the differences (Huang et al., 2005).

Conclusion

There are some significant differences between what teachers thought about mathematics in the school and students' mathematics that applied in their daily lives. Student uses his mathematics without

performing fixed rule in solving daily life problem. Teacher uses fixed rule based on mathematics formula in solving daily life problem. As a result, teachers answers is not solving real situation of the problems. It means that what teachers' thought about mathematics in the school is not always fit for all students, for example, the *doorsmeer student*. Besides, always force formal mathematics in solving daily life problems does not guarantee that it will make sense of the problem, which means formal math cannot solve the problem. Therefore, to some extent, there is a need for informal mathematics, which provides an alternative algorithm to solve the problem. For example, a teacher can also make wrong interpretation if too much forcing formal mathematics for every single daily life problem.

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