How teacher professionalism influences student behaviour in mathematical problem-solving process

Y Harisman¹, Y S Kusumah² and K Kusnandi²
¹STKIP PGRI Sumatera Barat, Jl. Gunung Pangilun, Padang Utara, Kota Padang Sumatera Barat 25000 Indonesia
²Universitas Pendidikan Indonesia, Jl. Dr Setiabudi No. 229, Bandung Indonesia

E-mail: yulyantiharisman_math@student.upi.edu

Abstract. Teacher professionalism in the learning process about problem-solving greatly influences student behaviour in problem-solving. Based on the literature review there were four categories of students in behaving when solving problems. This behaviour is apathetic, routine, semi-sophisticated, and semi-sophisticated. These behaviours are viewed from the ownership of knowledge, belief in the implementation of strategies and students' self-confidence. Then on the other literature review, there are three categories of teachers in solving mathematical problems, namely: good, very good, and excellent. The aspect of teacher professionalism is viewed from beliefs, attitude, depth and breadth of pedagogical and didactic aspects and teacher's reflection on the learning process about mathematical problem-solving. The grouping of three teachers’ professionalism and the grouping of the behaviour of eighteen students from three different cluster schools was obtained. In this study will be seen how the relationship between teacher professionalism in mathematical problem solving and learning and student behaviour in solving mathematical problems. This research was survey research on the subject of three teachers and eighteen students. Qualitative analysis will be presented on how each teacher category and student category will interact and influence each other. Based on data analysis, teachers who have sufficient professionalism tend to produce students who behave inadequately — the professionalism of teachers who are in the excellent category in learning about problem-solving results in many more sophisticated students.

1. Introduction
Students' behaviour in problem-solving is a response occurring when they face mathematical problem solving [1]. A study in problem-solving behaviour is essential in that when students have a great behaviour in solving problems they will achieve a greater achievement in problem-solving skill. Problem-solving is at the core of mathematics learning and supports other mathematical abilities.

There are numerous studies on students’ behaviour in problem-solving. Schoenfeld studied the behaviour of expert problem solver and beginner problem solver in solving problems [1]. The subjects of this study were college students. From the study, beginner problem solvers tended to show a behaviour of solving a problem based on the surface only, while the experts solved the problem by analyzing the patterns of the problems. Another study of mathematical problem-solving behaviour of elementary students in Tasmania, Australia, found that experts problem solver and beginner problem
solvers didn’t accommodate the behaviour directed for them [2]. The study classified students into three categories, which are: apathetic, routine, and sophisticated. Apathetic behaviour is oriented towards problem-solving behaviour which is only related to manipulating numbers in the problem. Routine problem-solving behaviour is oriented to structured behaviour, and sophisticated problem solvers are oriented to problem solvers that can generate their strategies when facing a mathematical problem.

Furthermore, Harisman’s study found four categories of problem-solving behaviour, namely: apathetic, routine, semi-sophisticated, and sophisticated [3]. It argues that the results of the previous research [2] did not facilitate the problem-solving behaviour that had been carried out. The results of Harisman’s study are shown in Table 1.

**Table 1. Students’ categories in each behaviour in Harisman’s study**

| Apathetic  | Routine  | Semi-sophisticated | Sophisticated |
|------------|----------|--------------------|---------------|
| Lutfi (R) S1 | Dhea (S) S1 | Annisa (T) S1 | Alvaro (T) S1 |
| Fikri (S) S1 | Najla (S) S2 | Zara (T) S2 | Nadhira (T) S3 |
| Divy (R) S1 | Febrina (S) S2 | Salma (T) S2 |                |
| Mesya (S) S3 | Dwi (R) S2 | Yani (T) S3 |                |
| Dita (S) S3 | Aulia (R) S2 |                |                |
| Fauzan (R) S3 |                |                |                |
| Rizky (R) S3 |                |                |                |

The meaning of the R symbol in Table 1 is for low-ability students, the S symbol for students with moderate abilities, and T symbol for high-ability students. S1 means that the student is from the first school, the S2 states that the student is from the second school and that the S3 shows that the student is from the third school. The grouping was done using the rubric developed by Harisman as described in Table 2 [2, 3].

**Table 2. Overview of students’ behaviour based on a range**

| Factors            | Behaviours Category                  |
|--------------------|--------------------------------------|
| Knowledge Ownership| Naïve | Routine | Sophisticated |
|                    | Making mistakes on the four-step problem-solving | There is no attempt to verify the solution | A high score on every step of problem-solving |
|                    | Unable to use the earlier solved problems | Able to identify similar issues, but not on the mathematical structure | Identifying similar problems |
|                    | Frequent use the same way to solve all problems | Focus on one way to solve a particular problem. Verbal communication is usually clear | Identifying other ways to solve the problem |
|                    | Written communication and verbal are not sufficient | | Written communication and verbal are adequate |
| Controls           | Metacognitive does not appear, either in written communication and verbal | Metacognitive thinking shown in verbal communication | Metacognitive thinking is clear in response to written and verbal |
| Confidence         | Doing almost the same strategies | Implementing strategies in a systematic way | Generates own strategy |
|                    | Relying on one or two strategies | Relying on more than two strategies, but can not move to another strategy when they fail | Willing to use a combination of several strategies |
| Affective          | Confidence is in line with a quick achievement answers | Often express lack of confidence in the problem-solving ability | Confident in the problem-solving ability |

These studies have examined in detail about students’ problem-solving behaviour, but rarely study how teacher's professionalism or teacher behaves in solving mathematical problems and learning about
mathematical problem-solving. Harisman has categorized teachers based on aspects that have been reviewed, namely beliefs, attitude, depth of aspects and didactic, and teacher's reflection on the learning process on mathematical problem-solving [4-7]. Harisman classified teachers into three categories of professionalism, and all came from three different schools: the teacher from the first school was a good teacher, the second teacher from the second school is a very good teacher, and the teacher from the third school was an excellent teacher [4-7]. The category in the aspect of beliefs in the problem-solving learning process is described in Table 3.

### Table 3. Teacher’s category in the aspect of beliefs in the problem-solving learning process

| Aspects                                           | Observation results                                                                 |
|---------------------------------------------------|-------------------------------------------------------------------------------------|
| Teacher's belief in mathematics                   | The teacher views mathematics as a creative science that is useful in everyday life (excellent). |
| Teacher's belief in learning about mathematical problem solving | The teacher views the learning of mathematical problem solving as it is emphasized on how students construct mathematical problem-solving processes (excellent). |
| Teacher’s beliefs in students in learning mathematical problem solving | The teacher views that if given a mathematical problem, students solve by exploring problem-solving strategies based on their interests (excellent). |
| Teacher's beliefs on mathematical knowledge for learning about mathematical problem solving | The teacher considers that in carrying out mathematical problem-solving, we must be able to adjust and distinguish the definitions used to solve problems (excellent). |

In Table 3, Harisman describes the teachers’ beliefs about the mathematics problem-solving learning process. Further, the study also reveals the aspect of teachers’ attitude in problem-solving which is in detail described in Table 4.
In Table 4, the teachers’ attitude towards problem-solving varies from good to excellent. The next aspect is the depth and extent of didactical and pedagogical aspects about mathematical problem-solving which is in detail described in Table 5.

### Table 4. Teacher's response to certain ideas, objects, people, or situations (attitude)

| Aspects                                              | Observation results                                      |
|------------------------------------------------------|----------------------------------------------------------|
| Teacher's attitudes to mathematical problem solving  |                                                          |
| First school’s teacher (T1)                         | The teacher likes enjoy and are interested when faced with mathematical problem-solving content *(excellent)* |
| Second school’s teacher (T2)                        | The teacher has a little phobia (fear) when faced with mathematical problem-solving content *(very good)* |
| Third school’s teacher (T3)                         | The teacher has a little phobia (fear) when faced with mathematical problem-solving content *(good)* |

| Teacher's attitude towards learning mathematical problem solving |                                                          |
|-----------------------------------------------------------------|----------------------------------------------------------|
| First school’s teacher (T1)                                     | The teacher looks like, enjoys, and eager in the learning process about mathematical problem solving *(excellent)* |
| Second school’s teacher (T2)                                    | The teacher looks like, enjoys, and eager in the learning process about mathematical problem solving *(excellent)* |
| Third school’s teacher (T3)                                     | The teacher is afraid when faced with solving content. The teacher does not seem nervous in the learning process about mathematical problem solving but is not so fond of, enjoying, or excited *(very good)* |

In Table 4, the teachers’ attitude towards problem-solving varies from good to excellent. The next aspect is the depth and extent of didactical and pedagogical aspects about mathematical problem-solving which is in detail described in Table 5.

### Table 5. Teacher's response to certain ideas, objects, people, or situations (attitude)

| Aspects                                              | Observation results                                      |
|------------------------------------------------------|----------------------------------------------------------|
| Use of various problem-solving strategies            |                                                          |
| First school’s teacher (T1)                         | The teacher asks students to display their problem solving process by only providing help with the instructions needed *(excellent)* |
| Second school’s teacher (T2)                        | Directing students to the problem-solving process with a predetermined strategy *(good)* |
| Third school’s teacher (T3)                         | Directing students to the problem-solving process with a predetermined strategy *(good)* |

| Mathematical problem-solving learning in a heuristic manner |                                                          |
|-------------------------------------------------------------|----------------------------------------------------------|
| First school’s teacher (T1)                                | Students understand the process of understanding problem solving from strategies they have constructed *(excellent)* |
| Second school’s teacher (T2)                              | Students and teachers understand the process of problem-solving by a predetermined strategy *(good)* |
| Third school’s teacher (T3)                               | Students and teachers understand the process of problem-solving by a predetermined strategy *(good)* |

| Creation of interaction between students, teaching materials, and teachers in the learning process |                                                          |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| First school’s teacher (T1)                                                                  | Two-way interaction with collaboratively involving other students in the mathematical problem solving *(excellent)* |
| Second school’s teacher (T2)                                                                 | Two-way interaction but does not involve other students in the problem solving *(very good)* |
| Third school’s teacher (T3)                                                                  | One-way interaction from teacher to student in the mathematical problem-solving process *(good)* |

And finally, the last aspect of the teachers’ category related to mathematical problem-solving is the teachers’ reflection. This aspect is in detail described in Table 6.
Table 6. Teacher's reflection on the learning process of mathematical problem solving

| Aspects                                           | Observation results                                                                 |
|--------------------------------------------------|-------------------------------------------------------------------------------------|
| Teacher's reflection on how to provide understanding to understand problems in the process of learning mathematical problem solving | First school's teacher (T1): Could reflect on the process of how to understand problems in the learning process about problem-solving, and provide alternatives on how to overcome them (excellent) |
|                                                  | Second school's teacher (T2): Could reflect on the process of how to understand problems in the learning process about problem-solving, and provide alternatives on how to overcome them (excellent) |
|                                                  | Third school's teacher (T3): Could reflect on the process of how to understand problems in the learning about mathematical problem solving but it is only limited to revealing the facts (good) |
| Teacher's reflection on the choice of strategies in the learning process about mathematical problem solving | First school's teacher (T1): Could reflect on the process of selecting strategies in learning about mathematical problem solving, and providing alternatives on how to overcome them (excellent) |
|                                                  | Second school's teacher (T2): Could reflect on the process of selecting strategies in learning about mathematical problem solving, and providing alternatives on how to overcome them (excellent) |
|                                                  | Third school's teacher (T3): Could reflect on the process of selecting strategies in learning about mathematical problem solving but it is limited to revealing only the facts that occur in class (good) |
| Teacher's reflection on the implementation of strategies in the learning process about mathematical problem solving | First school's teacher (T1): Could reflect on the process of implementing strategies in learning about mathematical problem solving, and provide an alternative on how to overcome them (excellent) |
|                                                  | Second school's teacher (T2): Could reflect on the process of implementing strategies in learning about mathematical problem solving, and provide an alternative on how to overcome them (excellent) |
|                                                  | Third school's teacher (T3): Could reflect on the process of selecting strategies in learning about mathematical problem solving but it is limited to revealing only the facts that occur in class (good) |
| Teacher's reflection on verification of solutions in the learning process of mathematical problem solving | First school's teacher (T1): Could reflect on the verification process of solutions in learning mathematical problem solving, and provide an alternative on how to overcome them (excellent) |
|                                                  | Second school's teacher (T2): Could reflect on the verification process of solutions in learning mathematical problem solving, and provide an alternative on how to overcome them (excellent) |
|                                                  | Third school's teacher (T3): Could reflect on the process of selecting strategies in learning about mathematical problem solving but it is limited to revealing only the facts that occur in class (good) |
| Reflection on students in the learning process of mathematical problem solving | First school's teacher (T1): Could reflect on students' behaviour during the learning process of mathematical problem solving, and provide alternatives on how to overcome them (excellent) |
|                                                  | Second school's teacher (T2): Could reflect on students' behaviour during the learning process of mathematical problem solving, and provide alternatives on how to overcome them (excellent) |
|                                                  | Third school's teacher (T3): Could reflect on the process of selecting strategies in learning about mathematical problem solving but it is limited to revealing only the facts that occur in class (good) |

This study, which is a continuation of research conducted by Harisman [3-7], will review how the relationship is between students’ behaviour in problem-solving and professionalism of teachers in mathematical problem solving and mathematical problem-solving learning.
2. Method
The research method used is a survey. Three teachers from the first high school were taken as the subject of the research with different clusters. Then six students were selected for each class taught by the teacher. At the beginning of the study, the teacher has been grouped by categories in Table 1. This grouping has been carried out by Harisman [4-7] in his research. The study involved three teachers by videotaping, giving questionnaires and interviewing teachers in each lesson on geometry material. Furthermore, grouping students based on Table 3 has been done by Harisman [4] in her research. The study involved eighteen students; six students were taken from each class taught by the teacher. Students are given problem-solving questions. Next students are interviewed and observed during the problem-solving process to see their behaviour. The process of conducting this research can be seen in Harisman's research [3]. This research is a continuation of the study which highlights how the relationship between professionalism in the learning process about problem-solving and student behaviour in mathematical problem-solving.

3. Results and discussion
The connection between this research and the results of Harisman's [3] and Harisman's [4-7] research will be seen in the results and discussion section. The following will show a chart of the relationship between teachers and students in behaving in problem-solving.

3.1. Results
The link between how the teacher categories in the learning process about problem-solving and student behaviour in solving problems will be highlighted in this section. This categorization was carried out in previous studies. Obtained by three categories of teachers, namely: good, very good, and excellent. Then there are four categories of student behaviour in solving problems, namely: apathy, routine, semi-sophisticated and sophisticated. The research subjects were taken from three schools where school naming was not the actual name. School one, school two, and school three are taken as the term school naming.

Figure 1 portrays the professionalism of one teacher and six students with three different abilities (high, medium and low) from the first school.

![Figure 1. Chart of teacher professionalism and student behaviour at the first school](image)

| Behaviour Category | Apathetic | Routine | Semi-sophisticated | Sophisticated |
|--------------------|-----------|---------|--------------------|---------------|
| Lutfi (R) S1       |           |         |                   |               |
| Fikri (S) S1       | Dhea (S) S1 |         |                   |               |
| Divy (R) S1        | Annisa (T) S1 |       |                   | Alvaro (T) S1 |

Figure 2. Chart of teacher professionalism and student behaviour at the second school

The chart in Figure 2 shows the professionalism of one teacher and six students with three different abilities (high, medium, and low) from the second school.

![Figure 2. Chart of teacher professionalism and student behaviour at the second school](image)
The chart in Figure 3 shows the professionalism of one teacher and six students with three different abilities (high, medium, and low) from the third school.

| Third School Teacher (very good teacher) | Behaviour Category |
|----------------------------------------|--------------------|
|                                        | Apathetic         |
|                                        | Routine           |
|                                        | Semi-sophisticated|
|                                        | Sophisticated     |
| Mesya (S) S3                           | -                 |
| Dita (S) S3                            | Yani (T) S3       |
| Fauzan (R) S3                          | Nadhira (T) S3    |
| Rizky (R) S3                           |                    |

**Figure 3.** Chart of teacher professionalism and student behaviour at the third school

The categorization of teachers and students has been done in the Harisman study [3-7]. This paper only highlights the linkages between the two categories.

### 3.2 Discussion

Based on the findings obtained earlier for the first school, it can be seen that of the 6 (six) students who did mathematical problem solving, there were two low-ability students who were in the Apathetic category, one moderate student who was in the Apathetic category, one high-ability student who was in the routine category, one moderate student who was in the semi-sophisticated category, and one highly capable person who was in the sophisticated category. The behaviour of six students from the second school in mathematical problem solving had an orientation that two students with low abilities were in the routine category, two students were in the routine category, and two students who were highly capable was in the semi-sophisticated category. The behaviour of six students from the third school had an orientation that two low-ability students were in the Apathetic category, two students with moderate abilities were in the Apathetic category, and one high-ability student was in the semi-sophisticated category, and one high-ability student was in the sophisticated category.

After describing student behaviour in mathematical problem solving and teacher professionalism in the mathematical problem-solving learning process, this section discusses expert reviews about the relationship between the two. According to Muir [2], external factors that influence student behaviour are teacher professionalism in the process of learning mathematical problem-solving. Based on this, in addition to internal factors such as the factors of knowledge ownership, self-control, beliefs, and affective as described previously, teacher professionalism factors, such as: beliefs, attitude, depth and breadth of pedagogical and didactic aspects, and teacher's reflection on the process learning about mathematical problem solving also influence students' behavior in problem solving processes.

Some research reviews have been conducted by experts related to as to which teacher professionalism can affect students in the learning process. Zsoldos [8] argued that the attitude of an elementary school teacher to mathematics influences the attitudes of his students. Students' positive attitudes toward mathematics tend to be influenced by the teacher's positive attitude towards mathematics. Zsoldos's research [8] also emphasized that if we want to change students' attitudes toward mathematics, we must change the teacher's attitude toward a more positive direction first. Furthermore, Beswick [9] also saw the relationship between the beliefs held by teachers towards students they taught. In his research, Beswick [9] found that there was consistency between the practice of learning and students' perceptions of the beliefs held by the teacher, although it was not always consistent. Opolot [10] also stated based on the results of his research that teacher professionalism factors strongly influenced student achievement in science and mathematics classes in Uganda.

Furthermore, Muir [2] suggested that some students' behaviours in mathematical problem solving derive from the way they learn. Muir [2] obtained information from his research that students from the same school, for example, school M, showed the same behaviour in mathematical problem solving, where all students who came from the school, all students with low, medium, and high abilities, all behave routinely in solving problems given.
Muir [2] also revealed that perhaps narrow teaching related to approaches and textbooks led students to lean towards applying this method to mathematical situations including mathematical problem-solving. Muir [2] leaves a question in his research whether the success of mathematical problem-solving behavior places the teacher as one of the factors that cause students’ problem-solving behaviour to be less successful. Whether the learning process determines students or encourages students to make them able to generate their strategies, just as the sophisticated problem solver does so. Some arguments that Muir has yet to prove [2] are whether it is possible if routine learning is conducted where teaching focuses only on rigid mathematical structures resulting in students behaving sophisticatedly in mathematical problem-solving. Learning should consider several alternatives to solve mathematical problems, for students to generate strategies, to encourage students' metacognitive thinking, and to monitor the process of mathematical problem solving done by the students into sophisticated problem solvers.

This study tries to answer the questions and arguments expressed by Muir [2] and other researchers. Teachers' professionalism in the process of learning mathematical problem-solving in 3 (three) different schools has been categorized and reviewed. Teachers from these 3 (three) schools have different practices in the process of learning mathematical problem-solving. There are teachers who direct students to strategies that have been set beforehand, and there are teachers who free students in the process of mathematical problem-solving. Different things are also shown in the beliefs, attitudes, and reflections of the teacher discussed earlier. The following is a review of how students taught by each teacher behave in solving mathematical problems.

Based on the findings, students with low and moderate abilities from the third school were in the Apathetic behaviour category, while in the first school 2 (two) students who had moderate and low behaviour had variations in behaviour in Apathetic, sophisticated, and semi-sophisticated orientation. This shows that competent teachers have the potential to make students behave sophisticated.

These are supported by expert opinion, that: according to Willougby [11] if the teacher tells a strategy or sets rules at the beginning, it is not an effective way of developing students' mathematical problem-solving abilities. Furthermore, according to Stacey and Groves [12], success and incompatibility of problem-solving students place the teacher as the main and determinant model. Furthermore, the results of the study said that learning that encourages students to produce their list of strategies and see strategies that must be practiced to students but without reducing the complexity of students' mathematical thinking because it will make students behave routinely or apathetically. If the teacher's professionalism is investigated, it will be able to give a picture to the reader that teacher professionalism also contributes greatly to the success and failure of students in behaving in problem-solving. This was expressed by Rosales' research [14] which revealed that teachers were the last people who made decisions to strengthen the structure of students in solving problems.

However, there are some opinions that contradict this, but still, do not recommend dictating students with the choice of strategies at the beginning of learning. This was stated by Suydam [13] that there are indeed several strategies that must be taught to students but without reducing the complexity of students' mathematical thinking because it will make students behave routinely or apathetically. If the teacher's professionalism is investigated, it will be able to give a picture to the reader that teacher professionalism also contributes greatly to the success and failure of students in behaving in problem-solving. This was expressed by Rosales' research [14] which revealed that teachers were the last people who made decisions to strengthen the structure of students in solving problems.

Furthermore, Trigwell [15] in his research entitled "Relations between teachers 'approaches to teaching and students' approaches to learning" states that the relationship between learning models in class is closely related to the way students understand learning. This study concludes that learning that focuses on students will result in higher quality learning. Trigwell's point of view is also in line with Verschaffell [16] who examined three students taught by three different teachers. The results of his research show that teachers who have confidence that students can do their work based on the knowledge they have to produce good students in understanding the problems in the story problems.

4. Conclusion
Based on data analysis, teachers who have sufficient professionalism tend to produce students who behave inadequately — the professionalism of teachers who are in the excellent category in learning about problem-solving results in many more sophisticated students. Recommendations for further
research can see how teacher professionalism influences students’ gesture in mathematical problem solving or student’s gesture towards mathematical reasoning. Student gesture in mathematical problem solving and mathematical reasoning has been carried out by Harisman [17] and Harisman [18].

References
[1] Schoenfeld A H 1982 Expert and Novice Mathematical Problem Solving (Clinton: Hamilton College)
[2] Muir T 2008 I’m not very good at solving problem: An exploration of students problem solving behaviours The Journal of Mathematical Behavior 27 228
[3] Harisman Y 2018 Analysis of student behavior in mathematical problem solving and teacher professionalism in learning process at junior high schools (Bandung: Universitas Pendidikan Indonesia)
[4] Harisman Y 2018 Teachers reflections on students mathematical problem solving in junior high school Journal of Physics Conference Series 1088 012011
[5] Harisman Y 2018 The attitude of senior high school teachers on mathematical problem solving Advances in Mathematics Science and Engineering for Elementary Schools (Yogyakarta: SAMSES)
[6] Harisman Y 2018 Pedagogis and didakits of junior high school teachers on learning process on mathematical problem solving Mathematics Science and Computer Science International Seminar (Bandung: Universitas Pendidikan Indonesia)
[7] Harisman Y 2018 Beliefs of junior high school teachers on learning process on mathematical problem solving International Conference on Mathematics and Science Education (Bandung: Universitas Pendidikan Indonesia)
[8] Zsoldos and Luliana 2015 Changing pre-service primary-school teachers’ attitude towards mathematics by collaborative problem solving Procedia-Social and Behavioral Sciences 186
[9] Beswick K 2005 The beliefs/practice connection in broadly defined contexts Mathematics Education Research Journal 17 39
[10] Opolot C 2014 Improving Communication Skills in Science and Mathematics Education for Quality Student Outcomes (Kampala: Makerere University)
[11] Willoughby S S 1990 Mathematics Education for A Changing Word (Alexandria: Association for Supervision and Curriculum Development)
[12] Stacey K and Groves S 1985 Strategies for Problem Solving (Burwood: VICTRACC Ltd)
[13] Suydam M N 1980 Untangling clues from research on problem solving Problem Solving in School Mathematics vol 34 ed S Krulik and R E Reys (Reston: National Council of Teachers of Mathematics)
[14] Rosales J, Vicente S, Chamoso J M, Muñez D and Orrantia J 2012 Teacher–student interaction in joint word problem solving: The role of situational and mathematical knowledge in mainstream classrooms Teaching and Teacher Education 28
[15] Trigwell K Prosser M and Waterhouse F 1999 Relations between teachers’ approaches to teaching and students’ approaches to learning Higher Education 37
[16] Verschaffel L, De Corte E and Borghart I 1997 Pre-service teachers’ conceptions and beliefs about the role of real world knowledge in mathematical modelling of school word problems Learning and Instruction 7
[17] Harisman Y, Noto M S, Bakar M T and Amam A 2017 Journal of Physics: Conference Series 812 012039
[18] Noto M S, Harisman Y, Harun L, Amam A and Maarif S 2017 Journal of Physics: Conference Series 895 012048