5th ICRIEMS Proceedings
Published by Faculty Of Mathematics And Natural Sciences
Yogyakarta State University, ISBN 978-602-74529-3-0

Students' Error of Mathematics Problem-Solving in Ratio and Scale Material

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Abstract. Problem solving is one of major aspect in mathematics curriculum which required students to apply and to integrate many mathematical concepts and skills as well as making decision. However, students were reported to have error or mistakes in mathematics problem solving. The focus of this study is to discuss the major mathematics skills and cognitive abilities in learning ratio and scale that caused the error in mathematics problems-solving among students from students' point of view. The study was carried out on three focused group samples that were selected through purposeful sampling. A mixed qualitative and quantitative approach is used in order to have clearer understanding. Apart from the questionnaire given, focused group interviews were carried out. Interviews were recorded and transcribed. Data finding was analyzed descriptively. Data findings showed that respondents lacked in many mathematics skills such as number-fact, visual-spatial and information skills. Information skill was the most critical. The deficiency of these mathematics skills and also of cognitive abilities in learning inhibits the mathematics problem-solving. This understanding on how the deficits influenced the problem-solving is expected to give effective guide lines in preparing diagnostic instruments and learning modules in order to develop the mathematics skills

Keywords: *Mathematics Skill, Mathematics Problem-Solving, Mathematics Error*

INTRODUCTION

"Mathematics problem are really difficult. I did not know how to do it and I found error. That's why I did not finish it. I don't like Maths". These statements are quite familiarly heard when student are inquired about their homework. They seem to be struggling with their homework especially on mathematics problem-solving. Mathematics problem-solving is not a topis but a process underlie the whole mathematics programmes which contextually helped concepts and skills to be learned (Ibrahim 1997). Many mathematics skills were involved in problem-solving. However, large numbers of students have not acquired the basic skill they need in mathematics (Mohd Nizam & Rosaznisham 2004; Berch Mazzocco 2007). As a result, many students were reported to find error in mathematics particularly in mathematics problem-solving (Tay Lay Heong 2005; Tarzimah 2005; Mohd Johan 2002; Zalina 2005; Lim See Kiat 1995). If teaching and learning process is not equally effective for all students' error in mathematics skill needed in problem solving is one of the way to assist this group students.

The ability to use cognitive abilities in learning is crucial for a meaningful learning to take place (Stendall 2009). However, many students have hidrance in using these cognitive abilities in learning effectively. They were reported to find error in making the accurate perceptions and interpretations, memorizing and retrieving facts, giving concentrations and using their logic thinking (Zahara et al 2009; Tarzimah 2005; Ismaail 2009; Anderson & Lyxell 2007; Bryant 2006). Reports from TIMMS 2007 showed that Indonesian respondent had significantly low achievement in cognitive dimension which emphasized on thinking skill and problem solving. These skills are devided into three domains; (i) knowledge; (ii) application and (iii) reasoning. This statement showed that, students did not totally acquired mathematics skills needed especially in problem-solving. Many of them are still struggling and this finding should not be taken lightly. It is crucial to get the understanding of this problem. One of the major aspects in mathematics curriculum is to produce useful individual's skills to acquire problem solving and making decision. If the difficulties in many acquiring mathematical skills involved could be addressed, better programmes could be prepared to assist those students who are struggling with mathematics.

Problem Solving

Problem-solving is categorized into two aspects; i) how the problems are delivered-linguistic (using words) or nonlinguistic (using graphic or problem based); and ii) the illumination of the problem structure – information, objective and action-plan (Zhining et al. 1995). According to Ibrahim (1997), there are two main procedural steps in problemsolving: i) transforming the problem into mathematical sentences; and ii) computation of the operational involved in the mathematical sentences. Difficulties faced among students were more noticeable during the first procedural step in solving problem compared to the other. Polya (1981) stated that problem-solving is a process starting from the minute students is faced with the problem until the end when the problem is solved. There are many problem solving models (Table 1).

Table 1 : Problem-solving models

Polya (1981)	*Krulick & Rudnick (1996)*	*Zalna (2005)*
4-hierarchy phase	5-hierarcy phase	3-hierarcy phase
i) Understanding problem	i) Reading and thinking	i) Understanding problem
ii) Planning	ii) Analyze and planning	iii) Solving the problem
iv) performing	iii) organizing strategy	iv) Stating the answer
v) confirmation of the answer	v) getting the answer	
	vi) confirmation the answer	

A three phase problem solving process was adapted for the study. The three phase problem solving process consists of;

i) reading and understanding problem
ii) organizing strategy and solving problem
iii) confirmation of the answer and process

Each phase involved a different combination of mathematical skills and different cognitive abilities. In this study, cognitive abilities of learning were limited to the ability to focus, to make perceptions, to use logic, to memorize and to recall. According to Stendall (2009), the abilities to give good concentration, to make meaningful perceptions, to think logically and to use memory effectively are important factors in learning skills and solving problems. These abilities vary among students. Cognitive and psychological factors could affected the ability to use mathematics skills and thinking in problem-solving. Miranda (2006) stated that children might experienced difficulties in thinking and learning when they demonstrated difficulty in giving attention, describing orientation of shape and space, making perception by visual and auditory, memorizing simple things and understanding language. As a result, students might struggle in different phases in the process of problem-solving. According to Goldin (1998), support systems such as verbal-syntax, imaging, mathematics notation, planning, organizing & controlling and affective systems are critical aspects in problem-solving. Any interference in the systems might result in difficulties in problem-solving.

Error in Mathematics Skill and Problem-Solving

Lack of many mathematics skills caused difficulties in solving problem. Students are required to apply and integrate many mathematical concepts and skills during the process of making decision and problem-solving. Garderen (2006) stated deficiency in visual-spatial skill might cause difficulty in differentiating, relating and organizing informations meaningfully. However, the lacked of mathematics skills among students are varied (Hill 2008; Kaufman 2008; Berch & Mazzocco 2007; Garderen 2006; Osmon et al. 2006; Garnett 1998; Nathan et al. 2002). This study looked into five types of mathematics skills.

i) number fact skill *(proficiency of number facts, tables and mathematics principal);*
ii) arithmetics skill *(accuracy and logarithm in computational and mathematical working-procedure);*
iii) information skill (*expertise to connect information to a concept, operational, and experience as well the expertise to transfer information and transform problems into mathematical sentence*);
iv)language skill *(proficiency of terms and relevance of mathematical information)*
v) visual spatial skill *(skill to visualize mathematical concepts, manipulate geometrical shape and space meaningfully).*

Incomplete mastery of number facts, weakness in computational, inability to connect conceptual aspects of math, inefficiency to transfer knowledge, difficulty to make meaningful connection among information, incompetency to transform information mathematically, incomplete mastery of mathematical terms, incomplete understanding of mathematical language and difficulty in comprehend and visualising mathematical concept might result in difficulties (Garnett 1998; Nathan et al. 2002). These could lead to making various errors and confusion in the process of problem-solving.

Conceptual understanding and procedural knowledge are essential to skills in problem solving (Geary 2004). These skills should be supported by cognitive systems that control focus and interference in information processing. Apart from that, language and visual-spatial skills are also important to interpret and to manipulate information effectively in the working memory. Any obstacle at any levels could lead to difficulties in the process of problem-solving. The difficulties could become cumulative with time. Although, theoretically the age of eleven years old and upwards is the age of formal-operational phase but it varies according to the cognitive maturity. This could influence the degree of difficulties in spite of pedagogical, affective, physiology and psychosocial factors (Dacey & Travers 2006; Carnine 1997). Theoretically, based on Geary (2004) and Garnett (1998), lacked in mathematics skills that could caused difficulties in mathematics especially in problem-solving might be due to interference in cognitive abilities. Below is the theoretical framework of the study.

1. Background of the study

Many students struggled to accomplish mathematics especially in problem-solving (Ibrahim 1997; Garderen 2006; Zahrah et al. 2003; Tarzimah 2005). However, they still need to learn mathematics because of its importance in daily life (Ibrahim 1998; Meese 2001; Aziz 2002; Kaufman 2008; Berch & Mazzocca 2007). They must be able to solve problem because problem solving is important for the development of human competencies (T. Subahan 2007). In real life, students need to solve problems because that is a basic way to survive in our daily life and mathematics is seen as the language. The primary and secondary mathematics curriculum emphasized on arithmetic, problem-solving, communication, mantic-thinking, connection-building and technology application skills (Curriculum Development Centre, Ministry of Education 2003; 2001). Mathematics skills such as language, number fact, information and arithmetic are vital in problem-solving. Deficiency in any of these skills could cause error in mathematics skills among students (Hill 2008).

In Indonesia, studies showed that students found error in mathematics because, they had difficulty understanding and retrieving concepts, formulas, facts and procedure (Zahrah et al. 2003) and lacked the ability to visualize mathematics problems and concepts (Tarzimah 2005). Weakness in understanding concepts, logic-thinking and lacking of strategic knowledge caused errors in problem-solving (Tay Lay Heong 2005). Occurance of similar errors signified difficulties (Nik Azis 2008). A part from that, error analysis showed that students were lacking in arithmetic and procedure knowledge as a result from weak conceptual understanding (Latha 2007). Mohd Johan (2002) stated that many students could not bring meaning to the problems and did not know how to plan and perform the problem-solving strategies. However, not many studies emphasized on the error of mathematics problem solving related to mathematics skills deficit. If the error in mathematics skills involved are understood, better programmes to overcome the error could be prepared. Moreover, if learning approaches and teaching strategies applied did not fulfil the intellectual needs of the students, these could lead to students' difficulties in learning mathematics. Teachers need to understand students' potential, problems and learning difficulties in order to implement effective teaching strategy and to produce meaningful learning among students (Meese 2001).

Students' views on the error found might be a guideline in preparing diagnostics instrument and explicit programmes so as to assist this group of students. Understanding of the error found among students is crucial in preparing meaningful modules and programmes. Attention on specific mathematics skills might lead to more meaningful teaching and learning process. However, studies on problem-solving that were interrelated to the mathematics skills are still insufficient even though the understanding of the mathematics skills involved in the mathematics problem solving difficulties is essential. The purpose of this study is to get the understanding from students' perspective on;

i) What are the mathematics skills that might cause students' error in mathematics problem solving?

ii) How do the mathematics skills influence the students' error in mathematics problem-solving?

2. Methodology

The study was done using a combination of qualitative and quantitative approaches to gain a clearer understanding of students' difficulties in mathematics problem solving as well as to triangulate findings. Three grade A' secondary schools (*urban, sub-urban and rural*) situated in Negeri Sembilan, Malaysia were chosen using purposeful samplings (Creswell 2009; Weirsma 2000). In each school, students from an average class will be chosen by the schools' counsellor. A number of 107 students aged 14 years old were selected for the study. In each school, an adapted questionnaire consist of three section; section A- on demography; section B- related to mathematics skills; and section C- related to cognitive ability of learning (Garnett 1998; Stendall 2009) was given out to students. Topics involved were limited on Numbers. It is followed by a forty-five minutes focused group interview using an adapted interview protocol (Aiken & Groth-Marnat 2006). Each interview was recorded and transcribed. Items and construct measured in the questionnaires was validated using rasch model. Later the reliability of the questionnaires used was confirmed (*Alpha Cronbach = 0.79*). Quantitative data was analyzed descriptively using percentages and qualitative data was analyzed descriptively using coding.

3. Finding and Discussion

Table 2 shows the overview of the participants. Overall, the percentages of below average students in sub-urban and rural schools are higher compared to urban schools. This phenomenon might due to the difference in environment and family back ground that might affect the cognitive and affective development. Dacey & Travers (2006) stated that psychosocial factor could influence the difficulties faced among students. Furthermore the difference in the maturity of the students could cause variation in the error found among students in mathematics. Geary (2004) had stated that mathematics error could became cumulative within a time frame if not properly supervised. Early understanding and identification of the difficulties is critical for any intervention to be developed.

Tabel 2 : Overview of participants

Group participants	*GS1*	*GS2*	*GS3*
Schools	*Secondary1*	*Secondary2*	*Secondary3*
Types of school	*Urban*	*Sub-urban*	*Rural*
N. Students/group	*34*	*37*	*37*
Below average	*16 (47%)*	*22(59%)*	*25(68%)*

4.1 What are the major aspects of skill that might influence students' difficulties in mathematics problem solving?

Difficulties in mathematics skills were classified into number fact, arithmetic, information, language and visualspatial skills (Garnett 1998; Nathan et al 2002). As seen in the findings, mathematics skills' difficulties were acknowledged among respondents (Table 3).The mathematics skills among respondents showed lack of information skills. For secondary 1 (GS1), secondary 2 (GS2) and secondary 3 (GS3), less than 40% of the respondents had all the sub-skills in information skills such as making connections, manipulating information, stating mathematical sentence and determining formula to be used. Manipulating information and stating mathematical sentence were found to be the major sub skill of information skill that influenced the difficulties in problem-solving.

Another critical skill was visual-spatial skill. All groups seem to be lacked in shape orientation. Building a connection between problem and diagram also a challenge to the respondents, especially to those in sub-urban and rural school. According to Garderen (2006), deficiency in visual-spatial skill might cause difficulty in differentiating, relating and organizing information. Students who lacked in ability to meaningful visualize mathematics problems and concepts could cause difficulties in solving the problem (Tarzimah 2005).

For language skill, respondents in primary school lacked in understanding the terms whereas, respondent in secondary school lacked in understanding the mathematical language. These lacking caused obstacles in understanding the objective of the problem that affected the ability to solve the problem. According to Geary (2004), language and visual-spatial skills help to interpret and manipulate information effectively in the working memory.

Table 3 : Respondents Mathematics Skills

		students agreement on skill %		
Respondent	Skills/	GS1	GS2	GS3
Number facts skill	Concept	52.9	54.1	*45.9*
	Basic operational	*41.2*	*48.6*	***37.8***
	Fluency of tables	*41.2*	***29.7***	***32.4***
	Basic mental add/subtract	61.7	81.7	54.1
Arithmetics skill	Working-procedure	***32.3***	***37.8***	***35.1***
	Accuracy	**32.3**	***13.5***	***29.7***
	Algorithm	52.9	***24.3***	*48.6*
	Procedural knowledge	50.0	*48.6*	***16.2***
Information skill	Making connection	***14.7***	***13.5***	***24.3***
	Manipulating information	***26.4***	***8.1***	***16.2***
	Mathematic sentence	***5.9***	***8.1***	***37.8***
	Determining Formula	***32.3***	***10.8***	***18.9***
Language skill	Terms	*44.1*	***27.0***	*41.7*
	Language understanding	***35.3***	***21.6***	***25.0***
	Number value	64.7	*43.2*	50.0
	Understand the Objective	*47.8*	***18.9***	***27.8***
Visual-spatial skill	Arrangement of numbers	76.0	81.0	58.9
	Orientation of shape	***38.2***	***24.3***	***29.7***
	Application to daily life	***38.2***	***18.9***	***29.7***
	Shape-problem connection	*44.1*	***18.9***	***18.9***

The major sub skills in arithmetic skill which caused the difficulties faced among respondents in mathematics are showing the working–procedure systematically and ensuring the accuracy of the working procedure. In addition, number facts skills concerning concepts, basic operational and fluency of tables were more problematic to primary respondents compared to secondary respondents even though there was still a number of secondary respondents who still did not acquire the fluency in reciting tables. Tay Lay Heong (2005) had stated weakness in understanding concepts and lacking of strategic knowledge result in difficulties in problem-solving. Moreover, students who were weak in conceptual understanding were found to lack in arithmetic and procedural skills (Latha 2007). Thus, there might be an interaction among all these skills.

The main cognitive abilities of learning that might cause respondents' difficulties in mathematics was the ability to memorize and recall the facts which is related to making connection in their thinking. Table 4 shows that memorizing and recalling number facts and procedure, as well as making perceptions caused problems to majority of the respondents. These abilities indirectly influenced the competency of mathematical skills which are crucial in the ability to solve problems. The deficits could result in the difficulty of information skill. More that 50% from each group had problems in this area. Respondent might face difficulties in retrieving the facts involved as well as to recall the past learning experiences. As a result they could

not bring meaning into the problem. Zahrah et al. (2003) had found that students have major difficulty in retrieving concepts, formulas, facts and procedure during problem solving. Table 4 also shows that the ability to give concentration were not as good as the ability using logic. It was critical to the respondents. They might have many things to think about rather than learning. The awareness on the psychosocial and socioeconomic needs in life and the influence of environment might affect their concentration on learning. However, respondent were found to be able to use their logic thinking. This development might associate with the maturity in cognitive development. Although at the age, children should already achieve the formaloperational phase but there is variation according to the cognitive maturity of the children (Dacey & Travers 2006).

The findings could be used in the planning of approach to teach this group of students more effectively. Teaching mathematics concepts and skills using contextual approach with logic can be adapted for this group of students. However further research is essential. Meese (2001) stated that teachers need to understand students' problems and learning process in order to implement more effective and explicit teaching strategy so as to provide meaningful learning in students. According to Stendall (2009), the abilities to give good concentration, to make meaningful perceptions, to think logically and to use memory effectively are important factors in learning skills and solving problems. In addition, these skills could be learned and trained. If teachers understand the students' error, they could make a change towards creating a meaningful learning based on students' intellectual needs.

4.2 How do the deficits of the skills in mathematics and cognitive aspects of learning influence the students' difficulties in mathematics problem-solving?

In the process of problem solving, students had to go through 3-hierarchy phase of problem-solving. However, many students had failed to carry out the tasks of the first phase which is reading and understanding problem. Respondent had showed difficulties in this task.

GS2: "*....I got confused with the questions, teacher. ....What do the question want, what concept to use…how to answer the question..*"

Understanding the question is a crucial aspect in problem-solving. First of all, question needs to be understood, before problem could be solved (Polya 1981; Krulick & Rudnick 1996; Zalina 2005). However, because of the long sentences and many information involved, students got confused about the objective in the problem. They could not bring the meaning to the problem or might misunderstand the meaning. The misunderstanding caused uncertainty to what should they do with the problems. Which information was meant to be used? What was the story behind the problem? All this questions in their mind caused them confusion that might lead to errors.

The reason why students misunderstood problem could vary among students. They might have error in understanding the language, the mathematical terms used or making connection of the problem. Longer time needed to understand questions result in longer time to solve problems. Thus, students might not have enough time to solve all the problems in the time frame given. As the respondent pointed out;

GS3: *"..I have problem to understand the language in the question...so for me understanding the problem takes time…*"

In mathematics, language skills and visual spatial skills were vital in the process of understanding problems. Giving meaning to the problems was critical in order to understand the objective to accomplish. However lacked of these skills in many of respondents, caused them difficulties in bringing meaning to the information and objectives stated in the problems. As a result, meaningful connection between information in the problems could not be noticed. Consequently, decision on how to do about the problem was a chaos. Student who could not bring meaning to the problems, did not know how to plan and perform the problem-solving strategies (Mohd Johan 2002). One of the responses was,

GS1: "*..we always make mistakes in managing the facts in the questions…we don't know which fact to use first….we are not sure how to make connection… which fact and formula to use ..What fact to look for….in fact we got so confused on how to solve the problem...*"

Apart from understanding the problems, other difficulties faced by respondents were making decision on how to solve the problems. Often, when the respondents had understood the problems, they still could not solve the problems. They faced difficulty in making connection of the problems. This difficulty might due to the deficits in number fact skill and information skill. Connection between information and facts, facts and formulas could be inaccurate. Facts transfer into the objective of the problem could be misleading. Moreover, lack in these skills might lead to incompatible planning. Planning on how to execute the solving was difficult and incorrect. These create errors and confusion in the process of problem-solving. According to Garnett (1998) and Nathan et al. (2002), difficulty to make meaningful connection, inability to easily connect and transfer conceptual aspects of math to the knowledge and incomplete mastery of number fact might lead to varies kind of mathematics skills difficulties. Since the process is hierarchy, the obstacles in the first phase caused failure in other phases.

Students might also have difficulties in the second phase. During the phase, students need to organize the strategy to solve the problem and get the answer. In the process, students must be able to make correct perception and decision on what to do. They need to have information skill to organize the problem-solving strategy. They must know how to organize the information given, what concepts to be used, what are the number facts concerned, which operational to be carried out, what is the order of the operational procedure and much more. Later, to perform the strategy, number facts skills and arithmetic skill are crucial. Using those skills, students could know the correct concepts and facts to be used and could carry out the calculation accurately.

However, most of the respondents were not competent with all these skills. According to them, they were struggling when trying to make connection. Most of them failed to organize the information and to construct mathematical sentences which were important in the process of problem solving. This difficulty might be influenced by the respondents' ability to make coherent visualperceptions. Logic thinking and visual-spatial skill was said to underlie this ability. According to Garderen (2006), deficiency in visual-spatial skill might cause difficulty in differentiating, relating and organizing information. This could cause ineffectiveness in performing the problem-solving. One of the responds was,

GS1: "*…one of the difficult task in mathematics is transforming the information concerned into a meaningful mathematical sentences in order answer the problem.."*

GS3: "..*solving maths problem is difficult…. because we have to state the problem into mathematics sentences.."*

In fact, if they could organize the strategy, sometimes they just did not sure how to perform it. The respondents had stated that, quite frequently, while performing the solving-procedure, they could not recall the facts necessary like the concepts, tables and the calculation-working. Thus, they became uncertain and made errors in their solving– procedures as well as got the wrong answers. Ibrahim (1997) had declared that it was difficult to transform the problem into mathematical sentences. Stendall (2009) had stated that, the abilities to make meaningful perceptions and to use memory effectively are important factors in learning skills and solving problems. Difficulty in recalling facts showed that students were facing difficulties (Miranda 2006). From the group-interview, many of the respondents were having difficulties in number facts such as fluency of reciting tables and doing basic operational. Respondents were found to have problem in division. This derived from the incomplete mastery of tables and basic operational concepts as well as inconsistent in arithmetic working procedure.

GS2: *"..we still make mistake in the working procedure…"*

The achievement in problem solving is based on conceptual understanding and procedural knowledge (Geary 2004). Deficiency in mathematics skills such as number fact, concepts, and information and arithmetic skills together with the deficits to recall and to make perceptions could affect the phases in the process of problem-solving. Since the first two phases already quite challenging to the respondents, the third phase clarification of *answer and process phase*), was not seem necessary to the respondents. For them if they got through the first two phases, that was already a success. Nonetheless, it was not true because they might misunderstood the problem or make careless mistakes as the respond stated,

GS1: "*..making mistakes due to our carelessness also one of our big problem…"*

Some of the respondent had pointed out that because of the problem-solving is time taking, by the time they got the answer they were already bored. This made them lacked of interest to look into the same problem again. Estimated, on average, only 20% of the respondents in the class carried out the clarification phase. This could result from the ability to give good concentration. Many respondents seem to have difficulties in giving attention. Therefore they could not concentrate on a particular task in a longer duration of time. Concentration is more than giving attention (Stendall 2009). It is the ability to concentrate on a particular task in certain duration of time meaningfully with the force of intrinsic motivation. Moreover, to clarify the answer, they had to use and integrate all the mathematics skills which were a challenge to them. Therefore, not many respondents had gone through this third phase. Most of the respondents usually did not complete the whole process of problem-solving.

In another word, many of the respondents believed that mathematics problem-solving was difficult, tedious, needed a lot of knowledge, working procedures and time which create the obstacles in their mathematics performance and the difficulties they faced. But in actual, the obstacles were not the mathematics problems but the deficits of all these mathematics skills in the students that caused the difficulties. If students could master the skills needed, mathematics problems would not be the hindrance any more. Therefore, diagnosis to the skills involved is a way to assist students to realize their weakness and attempt to overcome it. However diagnosis based only on perceptions is not enough. Diagnosis based on performance should also be carried out for a more comprehensive diagnosis.

5. Conclusion

This study concludes that students faced difficulties in mathematic problem solving due to incompetency in acquiring many mathematics skills and lacking in cognitive abilities of learning. Information skill was found to be the most critical mathematics skills. Although students acquired other mathematics skills, without the transfer of information skill, they could not understand and make effective connection of the information in the problems.

Generally, the majority of the students did not acquire this skill utterly. Cognitive abilities in learning such as the ability to recall, memorize and perceive influence the efficiency of problem-solving.

Difficulty in mathematics skills experienced by students is a challenge for students to overcome. In adequate language skill, information skill and in mastery of number fact skill inhibits the efficiency of problem solving process. These lacking, result in uncertainty, confusion and inaccuracy in the decision making and making connection among information. These would lead to errors in mathematics problem-solving. Moreover, facts recall, was found to be difficult during making meaningful connection in the problems and could influence the efficiency of each phase in problem-solving. The inability to concentrate during the process of problem solving also may result in missing of the third phase *(confirmation of answer*) in

the problem-solving. This phase was not seen as essential in the process of problem-solving among students. Further research to analyze the above hypothesis should be carried out.

This study implies that, students' difficulties in problem-solving might occur at any phases. In fact it might be caused by a deficiency in any of the skills either independently or cumulatively. The understanding of the difficulties faced by students in any particular area and phase is the strategy to respond to this issue. Based on the understandings, it could provide a guide line for teachers as well as researchers to plan better approaches and effective teaching methods. Development of diagnostic instruments, modules and approaches were essential to assist the students which will result in more meaningful teaching and learning process. However, further research based on students' ability to perform the skill was necessary for more understanding regarding this issue. The identification of mathematics skills needed is essential to respond with the difficulties in mathematical problem-solving. These efforts could help students to be motivated managing and trying to improve their skills in mathematics problemsolving. The understanding of the issue, knowledge, skills and commitment of teachers are keys in assisting this group of students' success presently as well as in future.

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