ATTRIBUTIONS, METACOGNITION AND MATHEMATICAL PROBLEM SOLVING

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Synopsis

This is an on-going research project conducted at the National Institute of Education, Singapore. It is on the meaningful measurement of processes and products of learning in mathematics and science to address the issue of difficult learning. Using a learning inventory, students' attributions of successes and learning difficulties, their practices of metacognitive decision-making are examined on a sample of low-ability girls (grade 8; N=58) in a secondary school in Singapore. Eight girls with more than one attributions beyond their personal control are administered five mathematical tasks which are targeted at the five different stages of a problem-solving cycle. Their problem-solving behaviours, particularly their metacognitive decision-making and affection, are studied with reference to their attributional characteristics. The conclusion from this small-scale study is that apart from simply encouraging students to expend more efforts which are considered as within personal control, knowledge of cognitive skills and practising of metacognitive decision-making are necessary in helping them to overcome helplessness in mathematical problem-solving. The long-term benefits of this project is maximisation of achievement in mathematics education.


Theme 2 : Research and/or development projects concerning minimising of investment and maximising of achievement in science/mathematics education.
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Introduction

This article seeks to explore the interrelationships amongst three areas of cognitive and psychological functioning, namely, students' attributions to successes and failures, metacognitive decision-making, and mathematical problem-solving. Understanding of such interrelationships would enable the problem of difficult learning to be tackled through manipulating relevant motivational and attentional processes during task engagement. The long-term benefit is maximisation of achievement in mathematics education.

Design of Study

Under the rubric of meaningful measurement, Cheung and Loh (1991, p.73-74) outline fifteen questions, some of which may be relevant to their proposed five key stages of problem-solving, namely, problem-understanding, problem-representation, problem-execution, problem-control and problem-evaluation. In this study, these questions are reproduced below because they serve as a guidepost for the analyses of a learning inventory and interview data on attributions and metacognition in mathematical problem-solving.

- What the problem asks me to do?
- Do I need to break a problem into subproblems?
- What goal-directed content knowledge and heuristic strategies are accessible to me?
- Is there a related problem or pattern seen before?
- Do I need to look at some simple cases for some tentative explorations?
- Do I need to make a guess and check?
- Is the problem representation appropriate and complete?
- When to apply particular heuristic strategies?
- When to pursue alternative solution routes?
- When to review progress, within or between episodes, on how things are and where they lead to?
- What to do when an impasse has been reached?
- Am I surprised, irritated, frustrated, anxious, and confused?
- Can I tolerate ambiguity of results and premature closure?
- Is there another way to look at the problem?
- Do I need to check solutions by retracing steps?

In this study, the important question to ask is to what extent these metacognitive decision-making are useful for successful mathematical problem-solving. This would then be examined with reference to the students' attributional processes. Altogether,
there are two stages of data collection. At the first stage, two low-ability classes (58 grade 8 girls) of a secondary girls' school are administered the My Learning Inventory so as to study their attributions to successes and failures and the extent of their metacognitive decision-making. At the second stage, some students who attribute their successes and failures to more than one causes external to their personal control are administered five mathematical tasks to study their problem-solving behaviours.

**Design of My Learning Inventory**

The inventory comprises two parts (see Appendix 1). The first six questions in Part A ask whether students attribute their successes and learning difficulties to causes external to their personal control, such as lack of ability, luck, task difficulty, teacher bias, friends' and tutor's help (Cullen, 1985). The twelve questions in Part B ask what students always do during their lessons or reading. Students need to answer whether they are willing to try harder and strive in different ways when faced with learning difficulties. For those who are, it is an indication of attributing success to efforts which are considered as within personal control in overcoming helplessness. The last ten questions are on students' use of metacognitive decision-making strategies. These strategies include those commonly used in remediating reading comprehension (Haller, Child & Walberg, 1988; Chan, 1991) and in "reciprocal teaching" -- a dialogue between teachers and students for the purpose of jointly constructing the meaning of text (Palincsar, 1986).

**Design of Mathematical Problem-Solving Tasks**

There are altogether five quizzes, each calls for both ikonic and concrete-symbolic modes of cognitive functioning (Biggs & Collis, 1989). Thus, the two types of intuitive and declarative knowledge are required for problem-solving. It is hoped that students' problem-solving behaviours can be understood with reference to students' attributions of successes and failures and their practising of metacognitive strategies. Descriptions of the five problems are as follow

**Problem One**:

In a horse racing ground, Horse A can circulate the track twice in one minute, whereas for the same time Horse B and C can circulate three and four times respectively. If the three horses start the race at the same time, for how long would all be found to return to the starting point?

This probes students' efforts in trying to understand the problem. There are a number of possible answers, depending on how one would envisage the race to take place. Either one or both of the ikonic and concrete-symbolic modes of cognitive functioning may be utilised for successful problem-solving.
Problem Two:

A backyard is to be shared equally amongst three families. The wives of the three families agree to share the cleaning burden. Because of pregnancy, Wife C pays a total of 90 dollars to Wives A and B for her relief. How should Wife A and B share the money if they have worked for 5 and 4 days respectively.

This is a tricky problem for the students because they are likely to take the first two sentences easily for granted. Although they may not have difficulties in understanding the problem, they are unaware that there is a need to reconceptualise the problem because the cleaning burden is to be shared equally amongst the three wives.

Problem Three:

A person’s birthday lies on the first Thursday in January. If all the dates of Thursday in January add up to 80, what is the date of his birthday?

Students need to be equipped with knowledge of a calendar month. The fact that there may be four or five Thursdays in January would pose some problems for students counting the dates intuitively, or setting up an algebraic equation and then solving for its solution.

Problem Four:

A cross is to be made by cutting the given board (please refer to the diagram) into two pieces and then reassembled without losing any material. Indicate how the board should be cut.

This question mainly taps students’ iconic mode of cognitive functioning. It draws on students’ tacit knowledge in the making of a cross, while observing the conditions of cutting a board into two pieces and reassembling them without losing any material. Trial and Error is one way to start exploring a solution. However, for a systematic solution, means-end analysis on how to remove the non-right-angled corners is essential.

Problem Five:

The figure shown is a magic square. The sum of the three numbers when added horizontally, vertically and diagonally are all equal to 15. Change the nine numbers of this square so that the sum becomes 16 instead of 15. The rule is that the 9 numbers should all be different.
This problem allows the researcher to examine whether the students are systematic and persevere in searching for a solution. Students need to recognise that they need to change the size of the numbers. They need to have a mental breakthrough in that the 9 numbers need not be whole numbers.

Results of Study

There are two parts corresponding to the two phases of data collection.

A. My Learning Inventory

Table 1 shows the distribution of attributions of successes and failures amongst the 58 students in the sample. Attribution to Task Difficulty is most popular (36%), followed by Poor Ability (16%), Tutor’s Help (10%), Luck (7%) and Friends’ Help (5%). No student attributes her failure to teachers’ bias. Some of these ten students (20%) attribute to more than one causes, mostly in conjunction with Task Difficulty. Eight of these ten students would be observed for their problem-solving behaviours in the second phase of the study.

Table 1: Distribution of Attributions of Successes and Failures (29 out of 58 Girls)

<table>
<thead>
<tr>
<th>Attribution</th>
<th>Frequency (%)</th>
<th>Number of Attributions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Task Difficulty</td>
<td>21 (36)</td>
<td>14</td>
</tr>
<tr>
<td>Poor Ability</td>
<td>9 (16)</td>
<td>3</td>
</tr>
<tr>
<td>Tutor’s Help</td>
<td>6 (10)</td>
<td>2</td>
</tr>
<tr>
<td>Luck</td>
<td>4 (7)</td>
<td>0</td>
</tr>
<tr>
<td>Friends’ Help</td>
<td>3 (5)</td>
<td>0</td>
</tr>
<tr>
<td>Teachers’ Bias</td>
<td>0 (0)</td>
<td>0</td>
</tr>
<tr>
<td>Number of Students</td>
<td>29 (50)</td>
<td>19</td>
</tr>
</tbody>
</table>

Amongst the twelve metacognitive decision-making behaviours that students may deploy during their lessons or reading, three groupings are clearly discernible (see Table 2). Apart from these, three important findings can be summarised. Firstly, students generally believe that their reading ability can improve if they read more, although half of them attribute their successes and failures to causes beyond their personal control. Secondly, students lack organisers before, during, and after their lessons or reading. Worse still, they refrain from telling their teachers when they do not understand a lesson. Thirdly, about two thirds of the students try to make sense of their lessons or foretell what would happen next during reading. However, about half of the students do not persevere enough.
Table 2: Distribution of Students’ Use of Metacognitive Strategies (N=58 Girls)

<table>
<thead>
<tr>
<th>Metacognitive Strategies</th>
<th>% of yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that if I read more then my reading ability will improve</td>
<td>93</td>
</tr>
<tr>
<td>I always try different ways when I do not know an answer to a problem</td>
<td>86</td>
</tr>
<tr>
<td>I always read and reread in order to understand better some parts of the story</td>
<td>85</td>
</tr>
<tr>
<td>I always try to imagine the scene during my reading</td>
<td>79</td>
</tr>
<tr>
<td>I always try to guess what will happen during my reading</td>
<td>64</td>
</tr>
<tr>
<td>I always try to read a passage again when what I think is different from that of my friends</td>
<td>64</td>
</tr>
<tr>
<td>I always try to find the main ideas when I read</td>
<td>62</td>
</tr>
<tr>
<td>I do not give up even if I have tried many times to answer a problem</td>
<td>47</td>
</tr>
<tr>
<td>I always have some questions in mind before I read something</td>
<td>26</td>
</tr>
<tr>
<td>I always tell my teacher when I do not understand a lesson</td>
<td>21</td>
</tr>
<tr>
<td>I always ask myself questions quietly about what the teacher says during a lesson</td>
<td>21</td>
</tr>
<tr>
<td>I always try to make a short summary of my reading</td>
<td>14</td>
</tr>
</tbody>
</table>

When the responses are scored dichotomously (1=Yes; 2=No, Not Sure) and factor analysed, two oblique principal factors emerged (see Table 3). Factor I pertains to attributions to luck, friends' help, poor ability, and to some extent tutor's help as well. It is noted that "Read more to improve ability", "Reread to understand better", and "Try different ways to solve" have moderate negative loadings on this factor. This indicates that the percentage of students who do not deploy these three metacognitive strategies are more for those who attribute than those who do not. Factor II loads on "Attribution to tutor's help", "Guess what will happen", "Reread passage to ascertain", and "Try different ways to solve". This shows that students who attribute to tutor's help are more likely to guess, reread, and try more in order to complete their work. Interestingly, "Reread to understand better" and "Try different ways to solve" appear to have accounted for the very weak correlation between the two factors (r=0.15) of attribution and metacognition.
Table 3: Factor Analysis of Attributions and Metacognitive Strategies (N=58 Girls)

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Factor Loadings</th>
<th>Pattern Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Attribution to luck</td>
<td>71</td>
<td>7</td>
</tr>
<tr>
<td>Attribution to friends' help</td>
<td>58</td>
<td>19</td>
</tr>
<tr>
<td>Attribution to ability</td>
<td>56</td>
<td>0</td>
</tr>
<tr>
<td>Find main ideas</td>
<td>-8</td>
<td>4</td>
</tr>
<tr>
<td>Ask myself questions</td>
<td>-11</td>
<td>-1</td>
</tr>
<tr>
<td>Read more to improve ability</td>
<td>-31</td>
<td>-7</td>
</tr>
<tr>
<td>Reread to understand better</td>
<td>-69</td>
<td>28</td>
</tr>
<tr>
<td>Attribution to tutor's help</td>
<td>32</td>
<td>56</td>
</tr>
<tr>
<td>Guess what will happen</td>
<td>11</td>
<td>47</td>
</tr>
<tr>
<td>Reread passage to ascertain</td>
<td>-20</td>
<td>43</td>
</tr>
<tr>
<td>Try different ways to solve</td>
<td>-36</td>
<td>37</td>
</tr>
<tr>
<td>Have questions in mind</td>
<td>-16</td>
<td>26</td>
</tr>
<tr>
<td>Imagine the scene</td>
<td>-4</td>
<td>26</td>
</tr>
<tr>
<td>Attribution to task difficulty</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>Tell teacher when not understand</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Try many times to solve</td>
<td>-14</td>
<td>22</td>
</tr>
<tr>
<td>Make a summary of Reading</td>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>

Note:
1. Loadings greater than 0.3 in absolute magnitude are in bold
2. Inter-factor correlation is 0.15
3. Item 5 is omitted because no student chooses "yes"

B. Mathematical Problem-Solving Tasks

Eight of the ten students who attribute their successes and learning difficulties to more than one cause are administered the five mathematical problem-solving tasks individually. They are interviewed immediately after each task to ascertain what cognitive and metacognitive processes have gone on and what their feelings are. The interview data are structured using some of the fifteen questions listed earlier as guideposts. Because of space limitations, the research findings are summarised and reported below.

**Problem 1.** Most girls report they have difficulties in understanding the sentence "for how long all would be found to return to the starting point". They feel uneasy about a question capable of being perceived in different ways and hence having different correct answers. At times, they would bring in irrelevant information, such as the position of the starting point and the time to start the race, in order to justify that they cannot provide an answer. For those who can provide an answer, they are not confident at all. Out of the eight girls, only one girl provides two possible answers of 30 seconds and one minute. The first answer stems from the fact that it is a race and Horse A is the slowest, whereas the second answer assumes all
horses run round and round the track and hence it is the least common multiple of 30, 20 and 15 seconds. In spite of this, she indicates that she is only 80% confident of the second answer and not sure at all for the first one.

Problem 2. All eight girls divide the $90 from wife C into two shares of $50 and $40 according to the 5 and 4 days worked by wives A and B. All fail to observe the key condition that the three wives have to share the cleaning burden. Most girls plunge in and produce the wrong answer quickly. On the whole, they feel confident because they think they understand the question very well and that the question is easy. An interesting finding is that those girls who attribute their perceived successes to luck are only moderately confident. The following two excerpts illustrate the problem facing them.

T: Are you very confident of your answer?
S1: Not very. But much more than question 1. May be about 60-70%.
T: Why aren't you 100% sure?
S1: Not confident in myself. I am very careless and always make careless mistakes.
T: Would you like to check?
S1: It will make me more confused.

T: Are you confident of your answer?
S2: Not sure because the answer cannot be so straightforward and so "chicken" to work out.
T: What makes you think so?
S2: Because this is a problem.

Problem 3. Observations on metacognitive decision-making are rich in the two problem-solving stages of problem-execution and problem-control. Only two girls recognise the need for a 5-week calendar month and come up with the correct answer by counting in steps of 7 days and adding the dates to check the sum for 80. It is noted that this is done systematically on a number of special cases. One girl explains, "2 is a small number and January has 31 days, I can have five weeks". The use of an iconic mode of cognitive functioning is evident here.

Two other girls employ a concrete-symbolic mode of cognitive functioning. They attempt to set up an algebraic equation based on a 4-week calendar month and solve algebraically. They come up with a fraction as an answer. One girl notes that this is wrong and attempts to try some special cases and as a result gets even more confused. The other girl rescues the answer by writing the fraction as a verbal statement "somewhere between 9 and 10". She is 80% confident of this statement being accepted as an answer because it is obtained through calculations.

The remaining four girls adopt a qualitative approach. Initially, they try some special cases in a systematic way but to no avail. They all know when they have reached an impasse, without realising the need for a 5-week calendar month. After a few attempts, they begin to guess more haphazardly. The result
is that they all get more confused. For example, one girl guesses the answer to be the 5th of January. When queried, she attempts to justify by explaining, "January, there is 31 days, divided by 7 gives approximately 4. Since told that all add up to 80, so 80 divided by 4 get 20. Then since it is a Thursday, 20 divided by 4 again to get 5". Another girl also divides 80 by 4 to arrive at 20 as an answer. Interestingly, she claims that she has another answer, the 4th of January. To her, the first answer is more plausible because it is obtained through calculations and the second answer is only a guess. After prompted by the teacher to check her answers carefully, she notices that 4 is more sensible than 20 because it is not so big. Hence, she is prepared to place a higher 70% confidence on the guesstimate instead.

**Problem 4.** A common strategy that three girls deploy is to cut the board along CF into two pieces and then place one piece on top of the other orthogonally to form a cross. All of them notice the non-right-angled corners. Two of them give up because they cannot cut away the sharp corners without losing any material. The third one suggests to cut the board into three pieces and then glue them back to two pieces. However, this mental operation is believed wrongly by her capable of removing the sharp corners. In the same way, one piece can be placed on top of the other orthogonally to form the cross.

A fourth girl gets around the problem of sharp corners in an interesting way. Since the thickness of the board has not been shown in the figure, she reconceptualises the board into a 3-dimensional cuboid by mentally adding in three lines radiating from the three corners A, C and E inward to form a new corner of the perceived cuboid. This is then cut into two pieces to overlap again into a cross. All these show the tenacity of students' everyday tacit knowledge: a cross is often made in an overlapping way by nailing one on top of another. What the question required is a two-piece jigsaw-puzzle solution. In addition, students' mental operations of geometrical shapes and figures are not accurate. This can be improved by requiring them to draw out a plan of the solution process.

The other four girls are less sure on what is to be achieved. One argues that if only straight lines are to be remained in the cross and no material is lost, then it can only be done by folding. Hence, she is more concerned with the material that the board is made of. The other three girls interpret the condition "A cross is to be made by cutting the given board into two pieces" in an unconvincing manner. One girl simply cuts out a cross from the centre of the board in order to satisfy the condition of two pieces. She feels confident in her answer which is subsequently admitted as weird.

Another girl cuts away the top left and bottom right corners A and D and these are being glued together to form a rectangle. The remaining piece BCEF is mistaken by her to be a rectangle. According to her, two crosses can then be made from the two rectangular boards, with the awareness that there would be a loss of material. The last girl is also not very clear. She asks
whether two crosses are to be made or is it that two boards are provided. She has no way out except to cut the given board vertically into two pieces and then draws half of a cross onto each of the two cut pieces. These cases show that when the viability of the problem situation and its context is in doubt, students tend to patch here and there, trying to justify their solutions while observing the violation of some given conditions.

Problem 5. All girls appear to understand what is to be done and what the two requirements are. While the goal state of the problem is clear, the ways for most girls to proceed are by no means systematic. Two girls have difficulties in understanding the statement "change the nine numbers of this square". There is a confusion between two kinds of change, namely, "position of numbers" and "size of numbers". According to one girl, the former kind would "stick to the 9 numbers" whereas in the latter kind "all the small numbers have been used up" in order to balance the sum of 16. As a result of this paradox, she thinks she will stick to the 9 numbers and her problem-solving strategies are hence mostly ad hoc. The other girl "uses up the large numbers" instead because she likes the large numbers more.

The other six girls' use of problem-solving strategies range from ad hoc to the more systematic kind of searches. They all check for either one or both conditions of "sum of 16" and "non-duplication of matrix numbers". In brief, three girls adopt an ad hoc approach. Another one girl adds 1 to the number 5 in the centre of the matrix and attempts to alter the position of the other eight numbers. There is a duplication of the number 6 which she fails to handle. Yet another girl is more systematic by adding 1 to every number in the matrix and then replacing 9 by 1 in order to avoid the duplication of the number 9. Only one girl has changed problem-solving strategies when an impasse is reached. She starts by adding 1 to only one number in each of the three rows of the original matrix while checking for sum of 16. She finds it difficult to avoid duplication in the use of numbers. Next, according to a sequence of numbers from 1 to 9, she begins to fill the 9 numbers one by one into the matrix, still checking for required sum of 16. By doing this, she hopes that the two problem requirements are met simultaneously.

Students' Conception of Task Difficulty

Although all the eight girls answer question 2 wrongly, six of them think that it is the easiest. This can be explained in terms of their attribution of perceived success to the easiness in performing the task. To them, if they think that they have understood a problem and can obtain a sensible solution quickly, then the answer is correct and the question is easy. The other two girls have other thoughts. The girl with an attribution to both luck and friends' help thinks that although she can get some answers to the first three questions, she would be even more confused if she checks her answers. The last girl suggests that question 4 is easiest because all she needs to do is to attempt some drawings and there is no need to do any calculations.
Half of the girls find question 5 most interesting and challenging despite of its difficulty. They think that there are too many numbers to think about although it is fun to play with them. One girl regards question 3 as most difficult because she fails to deploy an elaborate algebraic approach in getting an answer. She normally attributes her failures to poor ability, but attributes success to luck and friends’ help. Another one girl attributes the difficulty of question 1 to her poor ability in understanding the question and this is also found to match with her attribution characteristics.

Discussion of Findings

Under the research agenda on the meaningful measurement of processes and products of learning, Cheung (1991) proposed a conceptual model seeking to explain difficult learning. The core idea is to view task engagement as essential for learning to take place and see comprehension as a meaning construction process. Learning becomes difficult when students cannot construct meanings by linking and revising their knowledge schemes. Motivation and attention are the necessary antecedents for deep cognitive processing to take place. Consequently, students’ attributions of successes and learning difficulties are potential variables influencing their motivational and information processing styles. The challenge for educational researchers and practitioners is to understand the dynamics of these attributional processes upon different modes of cognitive functioning within a problem-solving context so as to provide a knowledge base to overcome difficult learning. This study sets out with such an objective in mind.

This study establishes that amongst the low-ability junior secondary girls in the sample, attribution of failures to causes external to personal control such as task difficulty, poor ability, and tutor’s help is a common phenomenon. However, a student’s perception of task difficulty is found to be associated with whether she thinks that she can make sense of the problem and obtain a solution quickly. If she can, the solution is likely to be regarded as correct. Moreover, since some girls do not have the habits of finding the main ideas when they read and recapitulating what they read, they often do not know that they are already in the wrong track. For some girls, an answer is correct if it is obtained through calculations or if the guesstimate is a sensible one.

It is also found that girls with attributions to luck, friends’ help and poor ability have a small tendency not to read and reread in order to understand better, nor try to find different ways when they do not know an answer to a problem. They are often less confident than their peers in spite of their quick answers to problems that are perceived as easy and straight-forward. Conversely, girls with attributions to tutor’s help are found to guess, reread, and try more in order to complete their work. Perhaps their tutors have done a rather good job in going over the homework for them and urging them to have another look at the problems facing them.
What is more worrying is that most of the low-ability girls in the sample lack organisers before, during, and after their lessons. Their mental operations, particularly the ikonic mode, are not always accurate and their tacit knowledge sometimes induce them to perceive things in ways that are at variance with the mathematicians. They are uneasy about the possibility of multiple interpretations of questions and answers. They do not persevere enough after plunging in attempting a solution. Nevertheless, they often know when they have reached an impasse. Further problem-solving attempts mostly prove to be ad hoc and have made them even more confused. For those who can produce something that is less than certain, they would patch here and there and try to justify their solutions while observing and acknowledging the violations of some prescribed conditions. It appears that they can tolerate ambiguity of results and premature closures. The conclusion of this study is clear. Apart from simply encouraging students to expend more efforts which are within personal control, cognitive skills and metacognitive decision-making are necessary in helping them to overcome helplessness.
References


Appendix 1.

MY LEARNING INVENTORY

Name:

Class: Sex: Boy/Girl

Circle Yes, No, or Not Sure. Answer as honestly as you can. If you do not understand some words, please ask your teacher.

Part A: Your reasons for your success or difficulties in Learning

1. If I cannot understand a lesson, it is because of my poor ability.
   Yes  No  Not Sure

2. If I get good examination results, it is because I am lucky.
   Yes  No  Not Sure

3. If I cannot do my homework, it is because I find homework difficult.
   Yes  No  Not Sure

5. If I get good grades, it is because my good friend always helps me.
   Yes  No  Not Sure

3. If my teacher does not praise me for my homework, it is because my teacher is not nice to me.
   Yes  No  Not Sure

6. If my parents are happy with my grades, it is because my teacher always helps me.
   Yes  No  Not Sure
Part B: What do you always do during lesson or reading?

7. I always try different ways when I do not know an answer to a problem.
   Yes No Not Sure

8. I do not give up even if I have tried many times to answer a problem.
   Yes No Not Sure

9. I always tell my teacher when I do not understand the lesson.
   Yes No Not Sure

10. I always ask myself questions quietly about what the teacher says during a lesson.
    Yes No Not Sure

11. I always have some questions in mind before I read something.
    Yes No Not Sure

12. I always read and reread in order to understand better some parts of the story.
    Yes No Not Sure

13. I always try to find the main ideas when I read.
    Yes No Not Sure

14. I always try to imagine the scene during my reading.
    Yes No Not Sure

15. I always try to make a short summary of my reading.
    Yes No Not Sure

16. I always try to guess what will happen during my reading.
    Yes No Not Sure

17. I always try to read a passage again when what I think is different from that of my friends.
    Yes No Not Sure

18. I believe that if I read more then my reading ability will improve.
    Yes No Not Sure