**Newman’s Error Analysis- Why students make mistakes in written mathematical tasks.** (M.Anne Newman 1977)

**Conducting the Newman Interview-** this interview is best done as close to the day the problem was originally done incorrectly and before any class follow up has been done on the problem that may assist the student.

*\*Talk to the student in a friendly way,*

*\*Give them a fresh copy of the question/s they had problems with*

*\*Get the student to work out the answer again.* ***Do not assist*** *but sit with child listening. Encourage the child to show any working.*

*\*Once finished ask the child some or all of the 5 key Newman questions, noting any of the student’s answers which are particularly revealing*

*\*Decide on the Newman error classification-see below*

**The Five Newman Questions/Requests**

1. Please read the question to me.

2. Tell me, what is the question asking you to do?

3. Which method do you use to get your answer?

4. Show me how you get your answer, and “talk aloud” as you do it, so that I can understand how you are thinking.

5. Now, write down your actual answer.

During Step 4, listen carefully to what the child says and decide where you think, when the child originally attempted the question in the whole-class context, the first breakdown point is. Hence classify the mistake/error. (Go at least one step beyond what you think is the first breakdown point before stopping the child)

**The Newman Error/Mistake Analysis Procedure**

1.To identify **reading errors** (R): “Read the question to me. If you don’t know a word tells me.”

READING ERRORS (coded as R). An error would be classified as READING if the child could not read a key word or symbol in the written problem to the extent that this prevented him/her from proceeding further along an appropriate problem- solving path.

2. To identify **comprehension errors** (C): “Tell me, what the question asked you to do.”

COMPREHENSION ERRORS (coded as C). The child had been able to read all the words in the question, but had not grasped the overall meaning of the words and, therefore, was unable to proceed further along an appropriate problem-solving path.

3. To identify **transformation errors** (T): “Now tell me what method you used to find the answer.”

TRANSFORMATION ERRORS (coded as T). The child had understood what the questions wanted him/her to find out but was unable to identify the operation, or sequence of operations, needed to solve the problem.

4. To identify process **skills error** (P): “Now go over each step of your working, and tell me what you were thinking.”

PROCESS SKILLS ERRORS (coded as P). The child identified an appropriate operation, or sequence of operations, but did not know the procedures necessary to carry out these operations accurately.

5. To identify **encoding errors** (E) - an inability to express an answer in an acceptable form: “Tell me, what is the answer to the question? Point to your answer.” ENCODING ERRORS (coded as E). The child correctly worked out the solution to a problem, but could not express this solution in an acceptable written form.

If, when the child attempts the question for the second time, he/she gets the correct answer and, after the teacher has listened to the answers to the Newman requests, the teacher is convinced that the child originally made a careless slip, then, the error would be classified as CARELESS (coded as X).

**\*\*\*As teachers** we need to address the high number of students, up to 70%, who cannot read, comprehend or transform the question into the correct operation/s to solve the problem.

Newman’s research pointed to the lack of a deep understanding of mathematical vocabulary and the absence of links between the students’ formal language and mathematical skills, and their personal worlds.

**As Teachers we can find a pattern of errors for individual students**. Teachers should have information for that student based on the original whole class problem/ test item and any working out shown, the second attempt with teacher observing and the follow up Newman’s 5 question analysis. This then gives teachers the information needed to understand where the breakdown is occurring and then to help develop that student’s skills in problem solving.

**Modelling** should be present whenever a student attempts to solve a real-life problem or a mathematical word problem.

**Based on the article Active Mathematics in Classrooms: Finding Out Why Children Make Mistakes-And Then Doing Something to Help Them.**

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