

MY TRADITIONAL APPROACH

I SHOW STUDENTS MY THINKING

TEACHER

Goal is to provide a precise, organized presentation of the material. Realities of the task drive notation, choice of procedure, and pedagogical moves.

IF STUDENTS ARE PROVIDED WITH A CLEAR DESCRIPTION OF **MY** THINKING, **THEIR** UNDERSTANDING WILL IMPROVE.

MATH CONTENT

Questions

Student questions pertain to aspects of the procedure or to homework replicating aspects of the procedure.

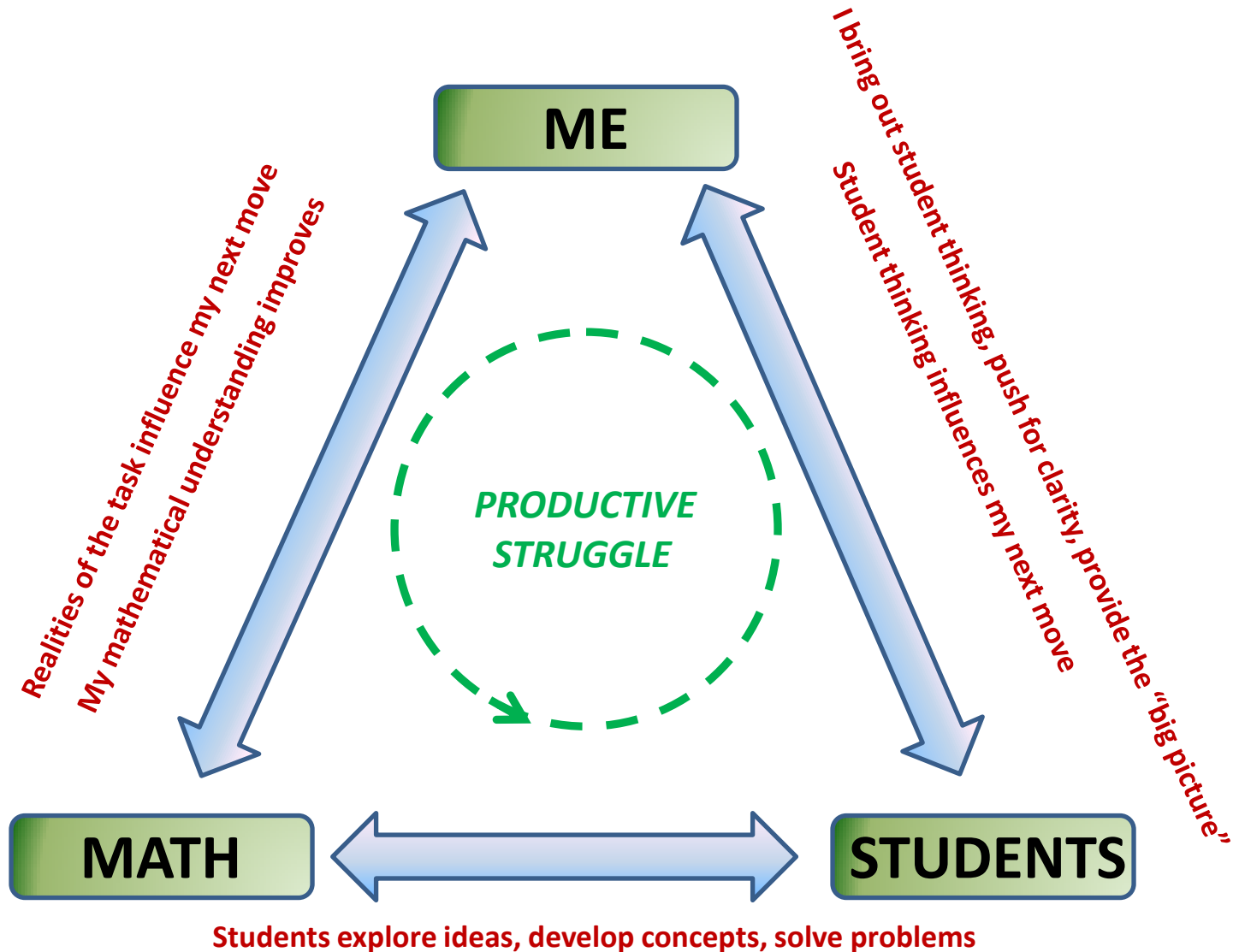
STUDENTS

SUCCESSFUL STUDENTS REFLECT MY THINKING

- **My responsibility as a teacher is to provide students with an explanation of my understanding of the task and provide them with exercises that allow them to internalize that understanding.**
- **My understanding is conveyed through carefully worked examples interspersed with rigorous definitions.**
- **If I can only make my explanations thorough enough, students will be able to understand and apply the procedures the same way I do.**
- **If students do not understand, then either they are not applying themselves, or they are not ready for the level of thinking required by the class.**

WHY DO SO MANY OF MY STUDENTS NOT UNDERSTAND?

THE LEARNING TRIANGLE



Realities of the task drive development of precise thinking, effective processes, efficient notation

- **There are three equal players in this learning process --- me, the students, and the mathematics.**
- **I must be in constant dialog with the students and the mathematics --- both must inform my pedagogical moves.**
- **I must present students with hard problems that allow them to engage in productive struggle and must be willing to accept multiple valid solution strategies.**
- **I must ask questions that inquire into student thinking rather than only probing for information.**
- **I must support and leverage student thinking to enhance problem solving ability.**
- **I must demand that students speak with meaning, precision, and intellectual integrity.**
- **I must introduce correct notation, terminology, and procedure as necessary and demand that students use them properly and consistently.**

I MUST ALWAYS SET THE EXAMPLE.

- **Students should question each other and me until they understand what a task is asking them to do.**
- **Students should analyze and critique each others' work.**
- **Students should develop a coherent strategy and be prepared to defend the reasoning behind it.**
- **Students should consider alternative strategies presented by their peers**
- **Students should engage each other and exchange ideas, building confidence in their own reasoning ability and learning to work productively with peers.**
- **Students should persevere in problem solving, even when the complete strategy is not yet apparent.**
- **Students should develop the habit of frequently checking the reasonableness of their solutions or steps leading to a solution.**