**Individual Reflection, Self Analysis, and Structured Peer Teaching**

**-** Daniel O’Neill, Mathematics Teacher, Sisters High School

**Reflections:**

Students write reflections after learning new concepts. Reflections contain two parts: concepts and learning style. Students must explain new concepts and procedures in their own words. They must also include something about themselves as a learner. This could be a specific learning strategy that they learned, an ongoing inner dialogue about the difference between memorization vs. understanding, observing how easy/ difficult it is to learn certain topics, or identifying what they will need to continue to do or start doing to be successful.

Reflecting on math concepts and using metacognition as an integral role in learning math in a meaningful way is usually fairly new to students. Doing this is new, difficult, and seems like extra work to many students. Early on, students often ask, “did I have to write a reflection last night?”. They aren’t always just looking for an easy way out, they really have a hard time deciding if they needed to reflect or not. My answer is always the same, “did you learn anything yesterday?”. After a while they start to see my point. This isn’t just another task they have to do but rather a focus on learning. I must teach them the difference between writing reflections just to get them done and writing reflections with the focus on learning. It is always refreshing to me how honest students are. They will usually acknowledge when they are doing something just to get it done which presents an opportunity to analyze that perspective.

**Whole Group Reflection Discussion**

I think it is imperative to have whole group discussions of reflections for at least a few weeks before using a different discussion structure. After the warm-up and homework questions have been completed, the reflection discussion can connect the previous day’s lesson to the new lesson. It really provides a great transition. Another reason why the whole group discussion is necessary in the beginning is that it provides a sense of accountability. I call on students at “random” to read their reflection to the class. All other students have their binders open to their own reflections and are ready to write notes about other students’ reflections. I will pause and correct students while they are reading reflections and give them a chance to make the corrections to their reflections. I make the point that it is ok to be corrected. Writing about math is difficult and students cannot expect themselves to write everything perfectly the same day a new concepts was introduced. After the student is done reading their reflection, I call on other students to give affirmations, point out the part that dealt with learning style, or ask a question based on something they thought they would hear about but didn’t.

**What about the students who refuse to reflect:**

The sad truth is that there will be students who do not, for various reasons, buy into the reflection strategy. I do not assume that they are lazy. I can understand that they, without the experience of benefitting from reflecting, doubt the usefulness. One way to win those students over is to talk about the importance of reflecting as a habit in every aspect of their lives. This usually works to some degree because they usually agree with that. The second strategy I use is really eye opening. If a significant portion of the class, more than a few students, have not written reflections I ask all students to close their binders. I then call on students to reflect. The students who wrote reflections are able to reflect. Their reflections are not word for word what they wrote but they are able to explain the concepts and are aware of themselves as learners. The student who did not reflect usually really struggle with putting the math concepts into words. The clear difference between the ability of students to reflect without looking at anything is indicative of the value of writing reflections. The students see that. An important side note is that if a student is capable of giving a good reflection even though they did not write the night before, I always say, “Great. Looks like you were able to obtain a deep level of understanding just by taking part in the lesson and doing your homework. Is that normal for you?”. Taking this perspective is part of keeping the focus on learning rather than them doing what I tell them to do.

**Reflection Buddies:**

After students have learned how to reflect and understand the value in reflecting, it is appropriate to change the discussion structure. It would be great if every student had the opportunity to read their reflection to an audience, get feedback and reciprocate for other students. So that is what we do! Student pair up with a “buddy” and read their reflections. After about 5 minutes we bring it back to a whole group discussion where I ask random students, “What did you hear in your partners reflection?”. This takes about 2 minutes.

**Self-Assessment– 4 Column Chart**

I have my students make cover pages for each unit within their notes. This divides their notes by units. They also have a four-column chart on their cover page. The first column lists the concepts (learning targets, standards, sub standards). The second column is just a check off column for if they understand the process or know the facts. The third column is a check off for if they have the skill mastered. The last column is for sample problems to serve as exemplars. I found that many students do not differentiate on their own between if they understand the process compared to if they have the skill mastered. This is a strategy that takes almost no class time and helps the students gain a perspective on how well they are doing and what they need to do in order to obtain the level of mastery they expect from themselves. For any concept not understood or skill not mastered, the students should have a specific problem that represents that topic written down. Taking the time to teach students a process for self -assessment goes a long way in helping them to take ownership for their own learning while fostering a “growth mind-set”, the notion that improvement is a function of working hard (practice/feedback) and being strategic (“smart is something you get, NOT something you are).

**Question Pairs/Peer Teaching**

Question pairs us a structured pairing/grouping that I use to differentiate structured practice allowing the students to focus on exactly where they need additional support. Using their self-evaluation (four column chart self-assessment tool), students pair up and go over a question/challenge with another student. This means that half of the students will be getting help and the other half are teaching. I talk about the value of each and how explaining a topic can help the teaching student to gain a deeper level of mastery. If one pair finishes their discussion in less than five minutes, they are to walk over and listen in to another discussion. They can just listen or look for an opportunity to interject. After the five minutes are up, we have a 2-5 minute whole group discussion where I randomly call on students to tell the group what they learned or taught. Time frames will vary depending on variables like; where we are in the unit, complexity of the content, quality of the discussions/teaching, etc. I will also use a version of question pairs to review key problems from the homework such that every student is engaged and focusing on what they didn’t grasp, especially students who are struggling with the content (rather than walking the whole class through a process that only applies to a couple of students).

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