Hanlon's Razor

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Never attribute to malice that which can be adequately explained by stupidity

What works is work!

Organizing Student Learning - the Overview

Today's Preparation Determines Tomorrow's Achievements

It's important to start the school year out right by making sure our students know how to learn effectively and efficiently. The most successful classroom teachers use the beginning of the year to frame expectations for the school year that set the stage for increased student achievement.

As the school year begins, I would suggest that teachers **call the parents** of their students enrolled in introductory classes, such as algebra and geometry. Teachers can take this opportunity to introduce themselves, tell the parents how delighted they are to have their offspring in their class, explain what they will do in their classes to help their child succeed and discuss student expectations; coming to class on time, paying attention, taking notes, homework, studying, testing and grades, etc. Having a positive first phone call going home in the beginning of the year strongly suggests that if teachers care enough to spend their off time communicating with parents, then they must be caring teachers. It also suggests to students that if you will call home for no apparent reason, then you will definitely call home if there are issues that develop during the school year.

A second suggestion is to always know exactly where you are going before choosing a path. Teachers must teach their assigned curriculum and address student deficiencies using linkage and the Long Term Memory Review (LTMR). For teachers that means **before they start their first day of instruction, they should have constructed a specification sheet and practice test identifying what they want their students to know, recognize and be able to do after the unit or chapter is completed** and how those specifications will be assessed.

Teachers entered the profession wanting to help students learn, what they say and their body language conveys that message. They are there to help students learn, create interest, enthusiasm and excitement about the subject they are teaching. That begins as the students enter their classroom - every day. **Student-teacher relationships are important!** The research strongly suggests that students will work for teachers they perceive as caring for no other reason than loyalty. Studies have also suggested that students are much more likely to stay in school if they have a mentor.

Just because someone knows the content does not mean they know how to deliver it in an understandable way. Teachers should set the stage for learning by explaining how the

concepts and skills they are teaching are used in daily life or connect them to math they have learned previously. Too often students get hung up in math by not grasping the big picture – what they are doing and why they are doing it.

While using common language is appropriate for introducing a new topic, teachers must remain cognizant that **the language of math has to be developed and learned** if their students are to be successful. By **developing concepts or linking them to previously learned mathematics or outside experiences**, teachers can build on students' past experiences, increase their comfort levels, review and reinforce concepts and skills, compare and contrast, and teach the material in a different context – all of which the research suggests increases student achievement. For example, teachers might connect the division algorithm learned in third and fourth grade to dividing polynomials in first year algebra or synthetic substitution used to solve higher degree equations using the Rational Root Theorem. By connecting the algorithms for adding fractions, decimals and percents, teachers have an opportunity to address deficiencies. Rather than teaching concepts in isolation, students would be better served if they knew the trig identity, $\cos^2 x+\sin^2 x =1$, equation of a circle, distance formula and Pythagorean Theorem are all the same formula, just written differently, because they are being used in a different context. Additionally, outstanding teachers **use simple straight forward examples** that clarify the concept or skill they are teaching without bogging the students down with arithmetic. Nothing ruins a good lesson more quickly than a bad example.

While instruction is extremely important, we need to remember that at the end of the year, textbooks are collected. The only thing that students have to refresh their memory in the future is their notebooks. Memory researchers have identified "writing it down" as their most important strategy for recalling information. Teachers who take great care to ensure student notes reflect and reinforce their instruction – what they want students to know, recognize and be able to do, will not only help students complete their daily homework assignment, but can be used to successfully prepare for the unit test and review for high stakes tests.

Good notes contain a date, objective, definitions, identifications, conceptual development with pictures and/or patterns that lead to a rule or formula, the rule, and practice problems based on the rule. Students should also be encouraged to write out in their own language what they learned. Additionally, if there was something out of the ordinary in the lesson, teachers can highlight that so it does not cause confusion at a later date. **Notes should reflect and support the instruction.**

Successful teachers also help students with spacing in their notes, if students don't have enough white-space in their notes, that may result in visual overload. That won't be helpful in learning effectively and efficiently.

In order to learn, students need to know what it means to study. Unfortunately, many don't. If teachers don't take the time to explain what learning is, if they don't model it, chances are students won't study effectively and efficiently. **Studying includes reading, thinking, reflecting, organizing, writing, analyzing, visualizing, reviewing,**

remembering, and recalling. Too many students think homework is about completion. Too many teachers think it's about completion and recalling, experienced teachers know there is more to it.

The next suggestion has to do with homework. Homework should reflect and reinforce the day's instruction and the notes taken from that instruction. All too often, homework is a page in the book with exercises assigned. The best homework assignments reflect what the teacher values. That is, homework that encourages studying; too many homework assignments don't.

A typical secondary math assignment in the United States looks like this:

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A more appropriate homework assignment that would encourage studying would look more like this:

Read Sec 4.2 Add/Subtract Fractions
Define Fraction
Write the procedure for add/sub fractions
Draw a model to represent adding fractions
Explain the relationship between the algorithms for adding fraction and decimals
Page 165 - 3, 4, 6, 11, 13, 16, 17, 21, 28, and 30

N.B. - *fewer exercises were assigned and the exercises were chosen specifically because they took into account all the nuances of the concepts and skills taught.*

That homework assignment includes components that encourage and reflect studying. Knowing standard algorithms is important in learning math so having it part of the homework assignment will help students complete the exercises assigned as well as being better able to verbalize their knowledge. On subsequent nights' homework, students might be asked to write the procedure for adding fractions again. Other questions might also be included in subsequent assignments, such as, why aren't denominators added when adding fractions.

The good news about including these types of questions in the homework is that teachers answer them in their instruction, and therefore the answers are contained in student notebooks. Students would have a tough time telling a teacher the reason they did not do their homework was because they did not understand since all they had to do for most of it was revisit their notes. And, if the students did answer those questions, there would be a much higher probability that they would be able to complete the practice exercises. **A good homework reflects and supports student notes and instruction**.

Teachers should also use the Long Term Memory Review (LTMR) that is required in the Components of an Effective Lesson to address student deficiencies and prepare for high stakes tests. Using linkage to introduce concepts and skills during instruction and the

LTMR to address deficiencies that would not normally come up during regular instruction will assist students in achieving and schools making AYP. Please note the resources on the RPDP webpage, www.rpdp.net. Under math, link to high school resources, then choose LTMR. Review sheets are already constructed based upon past performance of our students.

The next suggestion has to do with specific test preparation. With the instruction, notes and homework being aligned to help students be successful on their tests, **having a parallel constructed practice** test based on the specification sheet created before instruction and discussed earlier will again help focus student learning and increase student achievement. I'd recommend that practice tests be given to the students about halfway through the unit so they can work on it and ask appropriate questions along the way.

And just when you think you are done, here's another suggestion. Oftentimes students will learn concepts and skills in isolation successfully. For instance, in first year algebra, students are typically taught five different methods of factoring. As each method is introduced, the students are typically able to factor those polynomials. Then on the test when all five methods are tested at one time, students get them wrong. Why? What wasn't taught was how to **differentiate** between the polynomials and the five factoring methods that look alike for many students – comparing and contrasting – that results in students not maximizing their knowledge because they are not using the correct method for the specific polynomial.

Students of teachers who **speak positively** about how well they will perform on their test generally perform better than students of teachers that don't. The best teachers take the time to build confidence so each student is expected to come in and make a grade of A because all the concepts and skills to be tested were based on the instruction, notes, homework, and test preparation (practice test) they have been doing all along. They are ready!

By stressing positive student-teacher relationships with matching body-language, using the CEL and teacher expectancies, and connecting instruction, notes, homework, test preparation and tests, teachers will help students organize their learning, study more effectively and efficiently which, according to the research and experience, will lead to increased student achievement.

For free resources, visit www.hanlonmath.com and link to USEFUL RESOURCES.