

Balance tests and curriculum

Summary

When one group in a district wants tests that don't align with the curriculum embraced by another group, begin with the premise that different people are solving different problems as best they can. The mathematics leaders and teachers are trying to optimize learning and instruction while the district administration is trying to optimize management and the systems that inform it. In these circumstances, communication can break down between otherwise well meaning people. To avoid this and its consequences:

- Look for an approach that recognizes the legitimacy of both kinds of concern: learning and management.
- Bring focus onto the issue of what balance of mathematics proficiencies you want your students to learn. There is support from a wide spectrum of mathematicians and educators for a balanced diet with substantial portions of skills, conceptual understanding and problem solving prowess along with proficiencies in reading, writing and speaking mathematically. Harmony will often require some re-balancing.

To get the assessments and program into a manageable alignment, both have to pragmatically mix in some of what they lack. This implies that:

- The programs include some regular and systematic exercises recognizable to the parents as old fashioned basic skills. Homework is the best setting for such stuff. This mitigates the danger of a *Math Wars* backlash.
- The periodic district-wide assessments are balanced to include short items that reflect those on the state tests and conceptual and strategic problems that cut across topics and demand student thinking.
- To this end, the system introduces tasks from the substantial and growing range of *standards-based assessment* tools available to balance the short items
- The periodic assessments are complemented by the more frequent assessments embedded within the adopted program.

Balance in mathematics assessment discusses and exemplifies this key topic.

Challenges addressed

Our curriculum and our tests are at odds presents a familiar situation where different elements within the system, while in agreement in principle on a strategy for improvement, make specific practical decisions that pull teachers in conflicting directions.

The strategy

Begin with the premise that different people are solving different problems as best they can. The mathematics leaders and teachers are trying to optimize learning and instruction while the district administration is trying to optimize management and the systems that inform it. Both are aware of the importance of state tests but see them differently. For the mathematics leadership they are a constraint that must be satisfied in pursuit of broader and deeper learning goals; for the administration, they are the central, if not the only, measure of quality of outcome. In these circumstances, communication can break down between otherwise well meaning people. If it does, both become vulnerable to the political mayhem that can erupt from mixed messages going to teachers and parents.

The goal must be to find an approach that recognizes the legitimacy of both kinds of concern: learning and management. Management needs regular information. Learning needs good instruction. Good instruction needs good materials and a professional learning

community that develops its members. It also needs regular balanced assessment, embedded in the instruction and in the tests that administrators recognize as important. The strategy is to find a balance that is acceptable. It is there to be found.

Background

The district has been building consistency and a common understanding with all educational stakeholders in working towards mathematical understanding. The math supervisor has worked with the district, business leaders, legislators and higher education faculty to create a case for collaborating and supporting standards-based mathematics so all students see themselves as mathematical thinkers and successful problem solvers. Appropriate *standards-based mathematics curricula* and linked professional development have been introduced. However, at the same time the administration has decided to periodic assessment using standardized tests that are much narrower than the curricula or the standards, relying simply on their correlation with state tests. Teachers naturally feel pressure to focus on these narrower goals.

This is a common situation where different elements within the system, while in agreement in principle on a strategy for improvement, make specific practical decisions that pull teachers in conflicting directions

Principles

How can both kinds of needs be served with reasonable harmony? Before answering this question, consider the issue of what balance of mathematics proficiencies you want your students to learn. The "*Adding It Up*" (*National Research Council, J. Kilpatrick et al*) way of framing it has support from a wide spectrum of mathematicians and educators and is a good basic tool. However you frame it, a good program has a balanced diet. In that balanced diet will be portions of skills, conceptual understanding and problem solving prowess along with proficiencies in reading, writing and speaking mathematically. In other words, "purity" is the wrong image for a balanced program. What balance do your adopted programs strike? What balance does the adopted assessment strike? Obviously, they strike different balances. Harmony requires some re-balancing.

To get the assessments and program into a manageable alignment, both have to pragmatically mix in some of what they lack¹. This implies that:

- The programs should include regular and systematic exercises recognizable to the parents as old fashioned basic skills. Homework is the best setting for such stuff. Align it to the skills in the state tests. The key is to have just enough (every week) but not too much (not every day and no more than 10 minutes at a time). Synchronize with the adopted programs so that the exercises come after the instruction and conceptual development. This impurity will have huge political value in protecting the program from its most vulnerable flank – a politically sufficient segment of any community that can be inflamed by the argument, " they are not teaching ours kids to add, subtract, multiply and divide without calculators!" You HAVE TO SAY " Yes we are". (*Disarm math warriors* says more on tackling the backlash)

¹ 'Purity' is a dangerous way to think in your situation. It will lead you into a thicket of traps set by politically savvy purists of the opposite view. The math leadership must position itself as 'the pragmatists', aiming to do whatever works for the kids – *not* be portrayed as 'true believers' more concerned with their own beliefs, expressed in unfamiliar jargon, than with what is really going on with the kids.

- The periodic district-wide assessments are balanced to include short items that reflect those on the state tests and conceptual and strategic problems that cut across topics and demand student thinking.
- To this end, the system introduces tasks from the substantial and growing range of *standards-based assessment* tools available to balance the short items
- The periodic assessments are complemented by the more frequent assessments embedded within the adopted program. These periodic district-wide assessments must be balanced to include short items that reflect those on the state tests *and* conceptual and strategic problems that cut across topics and demand student thinking. *Balance in mathematics assessment* discusses and exemplifies this key issue, as does {*Jan de Lange; also Framework for Balance, other tools?*}. *Standards-based assessment* lists some of the tools now available {*cite MARS and MAP, Dana center tools*}

Note: any commercial vendor has a conflict of interest when asked if their product aligns with your standards; don't put them in that position. You or a third party should do the analysis of the alignment, preferably using one of the established *alignment protocols*.

Further, assessments that are designed by psychometric organizations tend to neglect the different types of 'cognitive demand', the varied proficiencies emphasized in "Adding It Up" and *PSSM*. It is not true, as they accept too readily, that 'item difficulty' can stand as a proxy for the different proficiencies. You can have easy problems for conceptual understanding, and hard problems for simple skills. They use an IRT model that collapses the content domain into one dimension: difficulty. This is contrary to the standards based model. They may talk about a 2-parameter model, but that won't help. You still want to know if kids learned what they were taught and what the state standards call for. You are not trying to sort kids along a scale with items that discriminate. Information cannot be defined as 'discriminating among test takers' in a standards based system. Information is "how far did the test taker learn what he or she was supposed to learn" even if 100% of the respondents get the same score.

Further, short items, while simple to assess, can only test the separate fragments of mathematical performance; they say nothing of the student's ability to select and use these elements effectively in solving worthwhile problems of the kind that appear in life, work and other school subjects.

- The periodic assessments should be complemented by the more frequent assessments embedded within the adopted program. An information system for collecting and aggregating some of the information about student progress through the program would make this instructional data digestible by management. Obviously, any aggregation of data from embedded assessments will lose much of the nuance useful to teachers. Nonetheless, district management has a legitimate interest in how students are progressing through the program they have adopted. A periodic broad-brush answer to this question can help stabilize communication between classroom and management.

Implementing the strategy

The key lies in *making the case* for better alignment to the system administration. It is wise to introduce the change gradually but with deliberate speed (see, for example, *assessment-led improvement*)

Evaluative evidence

Evidence on the influence of assessment on learning summarizes the research on the dominance of high-stakes test items over other curriculum goals – this is obvious to every teacher but regularly ignored by both test vendors and system administration.

Strengths

- removes a major barrier to student learning of mathematics
- adds a powerful driving force to standards-based improvement
- assessment tasks show vividly to all concerned the curriculum goals
- provides through the new assessment, an effective addition to the professional development of teachers, particularly if they are asked to score student work

Likely challenges

- resistance to all change, justified through extra costs
- poor communication between mathematics and assessment leadership groups

Tools:

Balance in mathematics assessment discusses and exemplifies this key topic.

Standards-based assessment list the tools available.

Alignment protocols lists the widely accepted methods for evaluating the alignment of a test with a given set of standards

see also

Math Wars and links therein, and *assessment-led improvement*

References

see text