

Date: April 4th, 2013

To: Members of the Haverford School Board

Cc: Frederick Brown, Curriculum Coordinator

Re: Proposed changes to the Math Program for Elementary School

Dear Members of the School Board:

As members of the community and the involved parents of two Chestnutwold students, we watched with interest the January 24th board meeting on the ‘*Everyday Math*’ (*EM*) program and the common core state standards (CCSS). At the forefront of the discussion on January 24th was which Math program the District should adopt, considering that the CCSS will be implemented in the fall of 2014. We have embarked on an extensive analysis of *EM* in relation to other math programs, and what follows are our evidence-based recommendations. Thank you in advance for your attention to and consideration of these issues.

Sincerely,

Diego Fernandez-Duque
Associate Professor of Cognitive Science, Psychology Department, Villanova University
diego.fernandezduque@villanova.edu

Jodie Baird
Assistant Professor of Cognitive Development, Psychology Department, Swarthmore College

April 4, 2013 1

Diego Fernandez-Duque, Associate Professor of Cognitive Science, Psychology Department, Villanova University
diego.fernandezduque@villanova.edu

Jodie Baird, Assistant Professor of Cognitive Development, Psychology Department, Swarthmore College

Executive Summary

- 1. *Everyday Math* is a strong math program with a proven record of effectiveness. The alternative program (*Singapore Math*) lacks such evidence-based support.**
- 2. *Everyday Math* is a program endorsed by the math education experts knowledgeable of school districts in the Greater Philadelphia Area. The alternative program (*Singapore Math*) has failed to gather such endorsements.**
- 3. *The 2012 CCSS Edition of Everyday Math* has the promise of being fully aligned with the core standards, a promise that the District ought to thoroughly consider before rejecting it. The analysis presented on January 24th was on a 2007 OUTDATED Edition of *Everyday Math* rather than on the 2012 CCSS Edition.**
- 4. The spiral approach is a feature of *Everyday Math*, not a glitch. It should be assessed on its merits, and it is an issue independent of the EM – CCSS alignment. Nothing in the spiral approach conflicts with anything in the core standards.**
- 5. An informal assessment suggests that *Everyday Math* is well liked by most of the teachers in the district.**
- 6. It would be unwise for the District to change programs without assessing how well those programs integrate with the middle school curriculum.**
- 7. Parents have been kept in the dark about these proposed changes; there is a need for more transparency.**
- 8. The deferment of CCSS implementation until 2014 now provides the opportunity to rectify these problems, in pursuit of reaching a well-informed and transparent curriculum selection.**

What follows are details and evidence that support each of these points in turn.

1. Which is the most effective program based on current evidence?

Current evidence-based data, as assessed by the [Institute of Education Science](#) –the research arm of the U.S. Department of Education- show two programs for which there is some evidence of effectiveness: *Everyday Math* and *enVision*.

- A. *Everyday Mathematics* (EM), reviewed in 2010, provides an 11 percentile gain for the average student, according to the one study that meets the IES strict quality standards (3400 students, grades 3-5).
- B. *enVision*, reviewed in 2013, provides a 6 percentile gain for the average student, according to the one study that meets the IES quality criterion (1150 students, grades 2, 4)

Importantly, *Singapore Math* was reviewed in 2007 with no studies meeting the IES quality standards. *Math In Focus* does not appear in the IES database presumably because it is a rather new program or possibly because it is evaluated under the Singapore Math label. This is not to say that these programs are ineffective, but rather that there does not seem to be evidence for their effectiveness at this time.

Therefore, before adopting Singapore Math or Math in Focus, the district would be wise to request and critically evaluate empirical articles that proponents of such programs have produced. Unfortunately, the information provided by the publisher of *Math In Focus* is unhelpful, merely a ‘research’ [link](#) in its website that leads to a pdf with glossy tables and testimonials but no research references.

In sum, according to systematic reviews of the evidence, *Everyday Math* ranks at the top with an effect twice as large as *enVision*. There is no evidence in support of the effectiveness of *Singapore Math* or *Math in Focus*.

2. Which programs are recommended by educational experts in the area?

In 2011, the Wallingford-Swarthmore school district commissioned an external review of its math curriculum. The review committee, chaired by Dr. [Janine Remillard](#), a professor at U. Penn Graduate School of Education who specializes in math education, made the following evaluation:

Everyday Mathematics (EM). The committee said that “continuing and improving the use of *EM* is a realistic possibility for the district. *EM* is a strong, balanced program that has been successful in many districts nationwide and in the Greater Philadelphia Region.” (p. 30). The reasons why the committee acknowledged the Wallingford-Swarthmore district might consider discontinuing *EM* do not apply to Haverford, such as “the problematic way that *EM* was implemented in the district” (p. 31).

EnVision The committee “recommend it with somewhat less confidence ... because it is newer and we know less about it” (p. 31)

Math In Focus (American version of Singapore Math). The committee was unable to recommend this program: “as it is relatively new, the district would have to complete more thorough research before including it as a viable choice” (p. 30).

The committee also considered as acceptable two other programs: *Think Math*, and *Math Expressions*.

In sum, according to experts in math education familiar with the Greater Philadelphia Region, *Everyday Math* is a strong and successful program with a longer and stronger record than the other alternatives currently considered by our district (*EnVision*, *Math In Focus*)

3. Is Everyday Math aligned with the Common Core State Standards (CCSS)?

A panel of teachers from the district was charged by Mr. Brown with assessing the alignment of EM to the CCSS. This panel found very big misalignments between EM and CCSS with up to 77% of CCSS items covered only marginally by EM. This contrasts the evaluation by the [New York City Department of Education](#) which found a reasonably good alignment between the 2007 edition of EM and the CCSS.

Most importantly, our district's panel was charged with assessing the outdated 2007 edition of EM –which preceded the CCSS- rather than assessing the 2012 edition of EM also known as *the CCSS Edition*. I think we can all agree that this was an unfortunate decision: Why review an old edition published *before* the standards were announced instead of reviewing the new edition which was explicitly designed to meet those new standards? The explanations provided at the January 24th meeting were that a quick glance at the two editions revealed only a few cosmetic differences, that the 2012 edition was also developed before the CCSS, and that the EM developers are reluctant to accommodate to the CCSS because they think it won't last.

All these statements have been refuted in the strongest terms by Prof. Andy Isaacs, the co-director of the University of Chicago Center for Elementary Math and Science Education and thus the main developer of EM. When asked in an email, Andy Isaacs replied:

“It is absolutely not true that we ‘began the 2012 revision prior to Common Core coming out so they [we] didn't have a clear understanding as of what the common core was going to be about and what was going to be covered.’ I don't know where Mr. Brown would have gotten such an impression, unless perhaps it was from a misunderstanding of the relationship between our unpublished copyright update and our CCSS edition. It is also absolutely not true that "EDM thinks that common core might not be around in three years so they [we] have a wait and see approach before they [we] invest in a version that fully aligns with the common core." We have little doubt that CCSS is here to stay for quite a while. No one who follows educational policy in this country can really think otherwise.... There are a large number of changes in the 2012 edition compared to the 2007 edition and a large number of changes since that edition was released. We had been working on a copyright update of the 2007 edition for a couple of years before the June 2010 release of the Common Core and were in page proofs, but that edition was never released. Instead, we shelved that edition and started immediately on what became the 2012 CCSS edition of EM.”

It is not surprising that *EM* would make a large effort to align its program to the CCSS. Since 47 states have adopted the standards, it is hard to imagine they could remain viable without doing so. EM has taken several steps to facilitate the alignment of EM and the CCSS including another [website](#) specifically designed to help “*EM* teachers translate the ideals of CCSSM's Standards for Mathematical Practice into a daily classroom reality”.

In sum, before concluding that EM does not meet the CCSS, the district would be wise to evaluate the most current edition of EM (v. 2012, aka CCSS Edition) and to do so following the authors' guidelines for alignment of CCSS and EM. A low cost-low effort alternative would be for the district to solicit advice from Radnor District which has already decided to adopt EM v.2012.

April 4, 2013 5

Diego Fernandez-Duque, Associate Professor of Cognitive Science, Psychology Department, Villanova University
diego.fernandezduque@villanova.edu

Jodie Baird, Assistant Professor of Cognitive Development, Psychology Department, Swarthmore College

4. Is EM a weak program from a pedagogical standpoint?

In the January 24th meeting, some concerns were raised about the spiral approach of EM, both in relation to the CCSS and as a feature for learning. Most of these concerns were expressed only tangentially.

First, it is important to highlight that this is a pedagogical issue rather than an issue of EM – CCSS alignment. Nothing in the spiral approach conflicts with anything in the core standards.

Second, the spiral approach is not a glitch, it's a feature. EM's emphasis on distributed practice (spiral) rather than on massive practice (mastery) is supported by research in cognitive science (we can provide references if the Board would like to see them), its effectiveness is evident in outcome assessments, and its usefulness is endorsed by experts in math education such as the External Reviewers of the Wallingford-Swarthmore Math Program.

Finally, since the implementation of EM, the gender gap in math activities in Haverford District seems to have narrowed. There might be some evidence to support this observation, as in a recent study of 3rd graders, girls were the ones that benefited most from EM. This finding comes from a PhD thesis and not a peer-reviewed article and therefore should be interpreted cautiously.

In sum, a review by educational experts, outcome assessments, and cognitive science studies all strongly support the claim that EM is a pedagogically sound program.

5. Are teachers dissatisfied with Everyday Math?

A program can only succeed if it is embraced by the teachers in charge of implementing it. Therefore, the concerns expressed by some teachers at the board meeting should not be dismissed. However, it is also possible that this is an artifact of biased sampling, where a vocal minority feels strongly about the program while a silent majority feels fairly content with it.

In a meeting I had with Mr. Brown on March 25th, I was reassured to hear from Mr. Brown that most teachers like EM, and that the impetus for dropping EM was not teacher dissatisfaction but rather a perceived misalignment with the CCSS. This issue could be explored in more detail by inviting all grade teachers to anonymously answer a 2-item questionnaire about (1) their satisfaction with EM and (2) their desire to adopt a different program.

A related question is whether teachers are receiving sufficient support and professional development to implement EM effectively. Research shows that the effectiveness of any math education program depends on teachers' understanding of its pedagogical features, and EM may be particularly challenging to teachers for a variety of reasons (see Wallingford-Swarthmore External committee).

In sum, an informal assessment suggests that *Everyday Math* is well liked by most of the teachers in the district, although the issue could be further explored via an anonymous survey. The district might consider increasing program support and professional development opportunities as a way to maximize teacher satisfaction and program effectiveness.

6. Fit with the curriculum in higher grades.

Surprisingly, this issue was completely absent from the January 24th meeting. Clearly, it would be unwise for the District to change the program for Elementary school without considering how well it integrates with the middle school curriculum. Apparently Everyday Math links well with Connected Math –the middle school math program- as stated on our district [website](#), but the issue may merit a deeper evaluation.

7. The need for transparency in the curriculum selection process.

So far, the process of reviewing the elementary school math program has occurred without the knowledge of parents and other members of the community. This is quite unfortunate and should be rectified as soon as possible.

Conclusions:

***Everyday Math* is a strong math program with a proven record of effectiveness, and seems well liked by most teachers in the district. In its most current version, *EM* has the promise of being fully aligned to the core standards, a promise that the District ought to thoroughly consider before rejecting it. Replacing *EM* with a different program would siphon time and resources away from other areas of development. It would also be disruptive to children caught in the transition, and could even be disruptive to the integration across elementary and middle school math. Making decisions about *EM* without the full participation of parents and the community would be a mistake. Luckily, the deferment of CCSS implementation until 2014 now provides us with an opportunity to rectify these problems, in pursuit of reaching a well-informed and transparent curriculum selection.**