National Math Panel Public Comment

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Recommendations

1. **Consider the important role of relevant, guided practice and continuous progress monitoring (with feedback) in improving student achievement in math.**

2. **Consider the critical importance of implementation integrity and the necessity of engaging in continuous progress monitoring as it provides teachers with the data on student performance and progress they need to manage instruction and make important instructional decisions.**

- **My name is Dr. Jim Ysseldyke and I'm the Birkmaier Professor of Educational Leadership at the University of Minnesota. I'd like to thank the National Math**

Panel for the opportunity to speak on an issue I believe is very important to your effort toward improving the quality of math instruction in our nation.

I'm not a mathematician nor a math educator but a trainer of school psychologists and a researcher whose work is focused on enhancing student competence and building the capacity of systems to meet student needs. I have served as Director of the University of Minnesota Institute for Research on Learning Disabilities, Director of the National Center on Educational Outcomes, author of the most widely used textbook on assessment of students with disabilities, and Editor of the Journal *Exceptional Children*. Specifically, I've conducted significant research on assessment and effective instruction of students at the margins. Recently my work has focused on policy issues, on components of effective instruction, and on improving formative assessment practices and data-driven decision making. I believe there is a well-confirmed knowledge base on principles and components of effective instruction. I also recognize the considerable difficulty we have of getting what we know works implemented in practice with fidelity. My colleagues and I identified 12 key components of effective instruction, and these are listed in the written testimony I have provided: Instructional Match; Instructional Expectations; Classroom Environment; Instructional Presentation; Cognitive Emphasis; Motivational Strategies; Relevant Practice; Informed Feedback; Academic Engaged Time; Adaptive Instruction; Progress Evaluation; Student Understanding. We have developed a methodology (the Functional Assessment of Academic Behavior) designed to enable educational professionals to assess the extent to which what we

know about effective instruction is actually occurring for individual students in classrooms.

I'm here today to talk about the most important and often overlooked components of effective instruction: the match of instruction to the level of skill development of the learner, relevant guided practice, formative assessment, academic engaged time, and differentiated instruction. I urge the instructional practices task group and the National Math Panel as a whole to consider the role of relevant, guided, monitored practice in improving student outcomes in math. By relevant practice, I'm referring to practice in which students are given adequate opportunity to work at high success rates with materials targeted to their individual skill level. By continuous progress monitoring, I'm referring to the use of systems that provide teachers with the information they need to systematically employ evidence-based components of effective instruction.

- **The notion that students need relevant guided practice likely appears obvious. Yet, the National Reading Panel, in their charge to inform policymakers, overlooked the importance of guided reading practice with feedback, focusing instead on the inconclusive evidence for the effectiveness of independent, unguided reading practice with minimal feedback. Researchers have shown a significant difference between these two types of practice; however, this was not specified in the reading panel's final report. The National Reading Panel's**

recommendations now serve as the foundation for federal education policy in reading, and have been implemented in schools all across the nation. As a result, states, schools, and districts have been left with an inaccurate impression about the importance of *all* reading practice, and are unable to provide sufficient in-class time for guided reading practice with feedback.

- **Now you faced with a similar and equally large charge. Like the reading panel, your recommendations will serve as the foundation for future policy. That is why it is crucial to consider the role of math practice and more specifically the right kind of practice: formative assessment of performance and progress, and direct immediate feedback to teachers and students themselves. I strongly urge you to look at the research supporting this important issue (Black & Wiliam, Fuchs & Fuchs, Deno). Our research shows quite clearly the effectiveness of relevant guided practice. I am leaving with the panel one copy of 8 of our data-based refereed publications that deal with the issue of relevant practice and continuous progress monitoring. I'd like to share a few interesting findings from my most recent refereed study.**

- **As part a study I did with Steve Tardrew that is in press with the *Journal of Applied School Psychology*, we studied the impact on student math achievement of a technology-based instructional management and progress monitoring system in 125 classrooms across 24 states. We selected the system because it systematically incorporated the evidence-based principles of effective instruction**

our earlier research had shown to be crucial. This system generates relevant math practice opportunities for each student matched to the student's current skill level, and teachers made time for this practice during class. The study examined student achievement gains in relation to the number of math objectives that students mastered --mastery serving as a proxy for relevant practice. This is more thoroughly explained in the manuscript I will leave with you today. Results of the comparison showed that for every math skill practiced and mastered, students impressively gained between .10 and .15 NCE, with students at the lowest pretest quartile showing the second highest rate of improvement.

- **Overall, students in treatment classrooms had math achievement gains that were significantly larger than students in control classrooms during the course of the 5-month study. Where implementation intensity was the strongest, the effects were the largest. Students in classrooms of teachers who implemented the program with integrity and intensity gained an average of 1.6 grade equivalents in just five months, compared to the control group's gain of 0.5 grade equivalents.**
- **I just completed a very large two year study with Dan Bolt of the University of Wisconsin. We implemented technology enhanced progress monitoring with 1800 students in 41 experimental classrooms and contrasted gains to those of students in 39 control classes. The results of regression analyses using residualized gain scores showed significant effects for STAR Math, but not for**

Terra Nova. Yet, we also obtained major school effects and school x experimental condition effects. A major factor was implementation integrity, with students in experimental classrooms mastering from 0 to 197 objectives. Further analyses in terms of high, middle, and low implementation showed significant differences. Those in the high group gained from 4 to 7 times those in the low or no implementation group. When implemented with integrity we got 4 to 7 NCE gain differences

- **Several other studies that my colleagues and I have conducted have produced very similar results -- relevant practice with continuous progress monitoring has produced extremely promising boosts in mathematics achievement for all types of students at all skill and ability levels, and implementation integrity is critical to getting the largest gains. Students who practiced more math at the appropriate skill level and who received direct frequent feedback on their performance, gained more. And, the practices work across all math curricula**

- **I recognize that what I have talked about is only a part of a complex puzzle. Even relevant practice with the use of frequent progress-monitoring does not help teachers who do not know how to teach suddenly become able to do so.**
- **I sincerely hope that you will make recommendations that call attention to the critical importance of putting into place evidence-based components of effective instruction, and that the components will include those we have been able to show have a solid effect on achievement.**

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