

**U.S. DEPARTMENT OF EDUCATION**

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**NATIONAL MATHEMATICS ADVISORY PANEL**

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**THURSDAY,  
SEPTEMBER 14, 2006**

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**SUMMARY**

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The Panel met in the Auditorium of the Broad Institute, 7 Cambridge Center, Cambridge, Massachusetts, at 9:00 a.m., Dr. Larry R. Faulkner, Chair, presiding.

PANEL AND EX OFFICIO MEMBERS PRESENT:

DR. LARRY R. FAULKNER	Chair
DR. CAMILLA PERSSON BENBOW	Vice Chair
DR. DEBORAH LOEWENBERG BALL	Member
DR. A. WADE BOYKIN	Member
DR. FRANCIS (SKIP) FENNELL	Member
DR. DAVID C. GEARY	Member
DR. RUSSELL GERSTEN	Member
DR. TOM LOVELESS	Member
DR. VALERIE REYNA	Member
DR. WILFRIED SCHMID	Member
DR. ROBERT SIEGLER	Member
DR. JAMES SIMONS	Member
DR. SANDRA STOTSKY	Member
MR. VERN WILLIAMS	Member
DR. HUNG-HSI WU	Member
DR. DANIEL BERCH	Ex Officio Member
DR. DIANE JONES	Ex Officio Member
MR. RAY SIMON	Ex Officio Member
DR. GROVER J. (RUSS) WHITEHURST	Ex Officio Member

PANEL AND EX OFFICIO MEMBERS NOT PRESENT:

MS. NANCY ICHINAGA	Member
DR. LIPING MA	Member
MR. TOM LUCE	Ex Officio Member
DR. KATHIE OLSEN	Ex Officio Member

STAFF MEMBERS PRESENT:

TYRRELL FLAWN	Executive Director
JENNIFER GRABAN	
IDA KELLEY	
KENNETH THOMSON	
HOLLY CLARK	

## **CALL TO ORDER**

Dr. Faulkner called the meeting to order at 9:06 a.m. He thanked Massachusetts Institute of Technology (MIT) for its hospitality and introduced Dr. Susan Hockfield, President of MIT. Dr. Hockfield welcomed the Panel to MIT, stressing the importance of the Panel's mission, and outlining a few of MIT's outreach programs, including contests, the Open Courseware Initiative, and the I-labs program.

## **PUBLIC COMMENT**

**Mary Waight, from the North Middlesex Regional School District of Massachusetts,** spoke on the successful implementation of Singapore Math program in her school district. In spring of 1998, 39 percent of district tenth graders failed a statewide assessment and 46 percent failed in 1999. To address the problem, changes were made at the middle school level. Changes included requiring that middle school math teachers be math majors, providing more instruction time, revising the curriculum, and hosting an institute on the acceleration of middle school mathematics, which introduced a syllabus issued by the Singapore Ministry of Education.

The Singapore Math Program calls for direct instruction. Its focus is on mathematical thinking with immediate application of skills to problem solving. Fewer topics are presented, but in greater detail, and visual representation is applied. The program was phased in starting in 2000 and rapidly expanded due to the indicators of success. Students are scoring dramatically better on standardized tests and advancing to more advanced math more quickly, showing the success of the change.

Dr. Schmid commented that the school had shown improvement in English as well. Ms. Waight agreed, saying that success leads to success, and there has been professional development in all fields.

Dr. Loveless asked what aspects of the Singapore curriculum are most important. Ms. Waight said that the simplicity and visual representation make students understand earlier, and the professional development makes better teachers. Dr. Fennell asked about instructional time and professional development. Students from first grade onward spend at least an hour per day on math. Ms. Waight responded that professional assessment was addressed through yearly assessments, a three credit graduate course, and ongoing mini courses. Dr. Siegler asked about the difficulty of the program that has caused school districts to drop it. Ms. Waight stressed the importance of administrative support and teacher enthusiasm. Additionally, the curriculum does not work well with certain standardized tests. However, it does build for success at the high school level.

**Holly Horrigan, a mathematician and parent in Needham, Massachusetts,** presented her concern about curriculum and pedagogy choices. She cited the example of her son, who quickly grasped math when it was taught in a traditional manner but was discouraged and unsuccessful under the curriculum adopted by the school, *Investigations*. Her research revealed that since the curriculum was introduced, the percentage of fourth graders at the advanced or proficient level plummeted from 85 percent advanced or proficient to only 53 percent. Despite complaints and poor Massachusetts Comprehensive Assessment System (MCAS) scores, the curriculum remains in place. She said this might be because the teachers and those making the decisions often have poor math skills. She submitted pages from the workbook demonstrating the system's flaws.

Dr. Schmid said that many mathematicians, including himself, had problems with *Investigations*. Dr. Ball asked if Ms. Horrigan had looked into the basis of the program design. Ms. Horrigan said that she had looked into the material for a year and was looking into the TERC philosophy. Dr. Siegler asked about the school's response to her findings. Ms. Horrigan said that the school had replied that MCAS scores are unreliable and that the school is looking into

purchasing an alternate assessment tool from TERC's publisher. Ms. Jones noticed that the introduction of a new curriculum in schools tends to lead to an increase in commercial tutoring centers in the district. Ms. Horrigan said she had observed the same.

**Richard Bisk of Worcester State College** said that students seldom arrive at college with sufficient math skills. Of incoming freshmen, 24 percent need remedial math and only 26 students take the calculus sequence. Students do not seem to have developed mathematically beyond the middle school level. They are uncomfortable with fractions and percentages and do not understand mathematical concepts. Many of these poor mathematicians go on to become elementary school teachers. The blame belongs to the education departments and licensing boards that have low and often irrelevant standards. Colleges should require stronger and more appropriate programs of study in math. The licensure process should require a demonstrated strong understanding of mathematics.

**Dr. Thomas Fortmann, an applied mathematician who has worked in academia and industry**, said that the students' math deficits are due to poor instruction at the elementary school level. He founded the Massachusetts Mathematics Institute, a professional development program that has instructed a thousand K-8 teachers since 2003. Because many elementary and middle school math teachers are deficient in math skills, which reflects the general low level of mathematic literacy, comprehensive professional development, such as that his institute provides, is needed. Teacher proficiency is vital, and no curriculum will compensate for its absence.

Dr. Fennell asked Dr. Bisk about a figure he had raised. Dr. Bisk reiterated that only 17 percent of the Massachusetts test for elementary school teacher licensure is mathematics. Middle and high school teachers have to take a test that is all math. The Conference Board of Mathematical Sciences' 2001 Mathematical Education for Teachers Report and a Chicago University report both outline specific mathematics for all levels. Dr. Schmid asked Dr. Bisk, who provided professional development for the North Middlesex implementation of the Singapore Math Program, to discuss the interaction between the program and professional development. Dr. Bisk said that the program focuses on mastering math through coherent development, so he focused on teaching the teachers math as a logical system.

Dr. Ball asked Dr. Fortmann about the importance of curriculum as opposed to teacher knowledge. Dr. Fortmann said that subject knowledge comes first, and a good teacher can overcome a bad curriculum.

**Solomon Garfunkel, the Executive Director of the Consortium for Mathematics and its Applications**, asked the Panel to not write a report on what is not known about math education, calling for more research and stopping innovation in curriculum development until the research is completed. The National Council of Teachers of Mathematics (NCTM) wrote the 1989 standards due to the same concerns about students and teachers, and the recommendation was to innovate. The NCTM report led to activity in the National Science Foundation to give grants to innovative content developers to extend the NCTM vision and allow researchers to see what worked. Evidence shows that some innovations have been useful. He hoped that the report would not cut off the funding for that research. He urged that curricula stress creativity, not just good test scores. He indicated that the Singapore program stifles creativity.

Dr. Wu pointed out that the American Mathematical Society (AMS) approved the NCTM recommendations without reviewing them and that Joe Boehler's research is disputed due to questions of method and quality. Dr. Schmid cautioned about generalizations regarding Asian curricula. He noted that the Singapore curriculum is similar to that in South Korea, which produces

high-functioning graduate students who come to America. Dr. Garfunkel said that his point was that a curriculum should be developed domestically as importing a curriculum would cut off domestic research and development. Dr. Schmid pointed out that funding is not the Panel's focus or in the Panel's power. Dr. Loveless asked Dr. Garfunkel his thoughts on Holly Horrigan's concerns. Dr. Garfunkel said that he did not support a particular curriculum, just the ideas and curriculum-building capacity that may be lost.

**Mark Driscoll of the Education Development Center, representing both TODOS and the National Council of Supervisors of Mathematics,** spoke on mathematical success among English learners. The number of children in non-English-speaking households has doubled in the past 30 years. Since math is usually taught in English, those skills suffer in those students. He described the Quasar Project, which found that learning gains were the greatest in classrooms that continually encouraged high-level student thinking and reasoning. This makes learning even more difficult for English learners, as language learning and content development are seldom integrated. Academic and mathematic language should be clarified, not simplified, and developed as part of content learning. Additionally, the use of multi-model communications will reinforce the learning of mathematical language.

Dr. Stotsky asked if he was aware of research on English learners exposed to language-heavy materials as opposed to less language-heavy materials. Dr. Driscoll knew of no such study.

**Mary Jane Schmitt spoke for the Adult Numeracy Network.** She stated that school returnees deserve a first rate mathematical education. However, students usually drop out because they did not get it the first time, so she urged the Panel to create an inclusive agenda that will address the needs of K-12 students while considering the needs of returning dropouts. The Panel's charge is to focus on a competitive future work force, but the current work force is important as well. The current workforce will be part of the future workforce, and surveys show that many adults lack the necessary math skills.

**Herbert Ginsburg, a cognitive development psychologist from the Teachers College at Columbia University,** argued that technologically-guided assessment of young children should play a prominent role in the education agenda. Ongoing assessment of the learner's performance and thought processes, the skills, knowledge, facts and ideas are crucial, regardless of the curriculum, since there are individual differences and fluctuation within the individual. Assessment is currently done informally, but automation provides greater depth and efficiency. Research into early childhood has given a good idea of what aspects of thinking and learning are important to assess. A good assessment should screen to predict future failure, use flexible cognitive diagnostic interviews, and monitor progress. Technology is in development to do that with a handheld computer that guides the teacher through the screening process, interviewing and process monitoring. This will guide the teacher's instruction by giving the teacher insight into the students' thoughts and possible difficulties as well as into math learning and teaching in general. The data will also help in administrative review. He urged the Panel to consider the usefulness of such a product.

Dr. Siegler asked what had been written on the product. Mr. Ginsburg said that the work is being released in the fall of 2006, but more data will continue to be gathered after that. Dr. Boykin asked about teacher training to use the device. Mr. Ginsburg said the training is being developed and should be in use in January. He hopes to make the training include broad supplemental professional development.

**Holly Concannon, a math teacher in Boston Public Schools**, reported on her experience as a teacher. She said that under the traditional method of teaching fifth grade math some students learn and others do not. However, even those who do well do not respond well to high level questioning and cannot explain their thinking. She now uses a broader approach, incorporating Investigations to help students develop computational skills and an understanding of underlying concepts and practical application. She said this approach reached more students because understanding how the student thinks makes her teaching more effective. These results have been seen throughout the Murphy School and are reflected on the MCAS. She stressed that successful implementation relies on professional development and teacher support.

Dr. Fennell asked for Ms. Concannon's reaction to Ms. Horrigan's comments. Ms. Concannon said that in Boston, the teachers have more professional development than the teacher Ms. Horrigan described. Additionally, parent workshops are offered to address parents' concerns, since the math will look different from what the parents are used to. She said that her students also had access to standard algorithms, which are also covered in class. Ms. Jones asked about her pre-service training as opposed to her in-service training. Ms. Concannon agreed that there had not been enough emphasis on math during her education and she relied heavily on professional development.

**Karen Wontan shared her experience as the parent of a sixth grade child at the Murphy School.** She advocated school-family partnering for student achievement and encouraged the Panel to look into districts with such programs. At first perplexed by her son's homework, she attended the parent workshops and saw the benefits of the curriculum. She now leads parent workshops, which she feels is a critical component to the demonstrated increase in student achievement.

Dr. Loveless asked about the level of participation. Ms. Wontan said that she had seen over 20 parents, but she did not know beyond her local workshops.

**Daryao Khatri and Anne Hughes of the University of the District of Columbia** reported on a research study they had done. The premise was that the old methods would yield the old results and that the only variable the teachers could control was themselves. First, the teacher must know the discipline; second, the teacher must know the principles of pedagogy; third, the discipline and pedagogy must be fused in one person. This was tested in the six-week summer math program for DC Public School graduates who had been admitted to UDC. Approximately 85 percent of college freshmen have to take two remedial math courses, and 10 of the 12 students in the class had tested into the lower of the two remedial classes. Pretesting showed a mean score of 35 out of 100 on an assessment test. The result of the study showed a 78 percent improvement in basic math and 44 percent for introductory algebra. Running out of time, Dr. Hughes concluded by reminding the Panel that the books covering the pedagogy used were submitted for their review.

**Stanley Ocken, a math professor at the City College of New York**, expressed concern that American high schools are not graduating enough mathematically competent students and as a result administrators are pressuring math departments to do something about low pass rates in pre-calculus and calculus courses. He urged the Panel to have a representative group of high schools and colleges assemble a college math guide, to include all the prerequisite topics to prepare students for freshman pre-calculus and calculus. That guide should then be sent to state education departments for the calibration of content and standards, to parent groups so they can demand that level of education, to education departments so they can prepare their students to teach to that level, and to curriculum and textbook publishers. He further suggested investigation in and

recommendations on pedagogy and retention as well as identifying potential indicators of successful college math students. He also suggested enunciating the importance of a coherent K-12 math curriculum that feeds into freshman calculus, eventually leading to a coherent K-16 curriculum.

**James Wendorf of the National Center for Learning Disabilities (NCLD)** expressed a hope that the Panel will pay particular attention to children who struggle to learn, especially in the early grades. Children with learning disabilities comprise 50 percent of the special education population. He made three recommendations: that the Panel (1) establish a priority for math disability research, (2) promote an explicitly inclusive approach to research-based instruction, and (3) define and delineate critical math skills at each grade level, since mathematical skills build from a foundation and those with disabilities need more intensive instruction to make that foundation. The approach of foundational skill development has applications outside of special education as well. NCLD has assembled a mathematic disabilities roundtable and is preparing two papers that will be published soon.

**Sally Mitchell, a chemistry and physics teacher in East Syracuse New York**, shared her experience. She took a five-year hiatus from teaching in 1987 and was shocked by how students' mathematical skills had declined. Students do not know how to measure, how to estimate, or use the metric system. They are calculator-dependent. She emphasized the confusion students have with both English units and the metric system and said that Americans should use the metric system.

**Nancy Buell of the Association of Teachers of Mathematics** in Massachusetts agreed that the elementary school classroom is where math fundamentals are built. However, she emphasized the role of the teacher, since teachers make the choice as to what gets taught. Even when there is a curriculum in place, they often make choices either with a limited understanding of the curriculum or mathematical skills development. She said that both *Investigations* and traditional teaching methods offer the opportunity to explore algebraic ideas if the teacher is aware of them. She advocated in-service programs to broaden the teachers' understanding of math.

**Anne Collins, president of the Association of Teachers of Mathematics in New England and director of Mathematics Programs at Lesley University**, advocated mandating a minimum of an hour per day be spent on math instruction and professional development for elementary and middle school teachers. She believed this would build a foundation for greater mathematical achievement. Students need to engage in mathematics early on and participate. Professional development should stress math fundamentals and underlying concepts. Very few students currently understand math and many dislike it. This is because math classes are not participatory enough and students don't understand the basic concepts.

Dr. Loveless asked about the decline in students who enjoy math and the inverse relationship between Trends in International Mathematics and Science Study (TIMSS) scores and math enjoyment. Ms. Collins said that math classes were changing in a way that allows for interaction, enjoyment, and more advanced math. Dr. Stotsky asked to what extent the use of full-time elementary math teachers is being adopted. Ms. Collins said that teachers are being trained by Lesley University. After the training, the teachers take the Massachusetts Tests for Educator Licensure (MTEL) and go back to their districts as math specialists. Her program trains specialists, but it does not know what the districts do with them.

## **REPORTS FROM TASK GROUP CHAIRS**

### **METHODOLOGY SUBCOMMITTEE: VALERIE REYNA**

Valerie Reyna, Camilla Benbow, Wade Boykin, and Russ Whitehurst are the members of the Methodology Subcommittee. Dr. Reyna, chair of the Methodology Subcommittee, reported that the group had incorporated feedback into the draft methodology guidelines. The draft has been distributed for feedback, and she invited further comments or discussion.

Dr. Gersten said it is a good document that should go further, since so many evaluations use very weak designs with many confounding variables. He suggested more specificity in the guidelines and that they be tested by reviewing existing studies. Dr. Reyna said there was discussion of creating an additional document, which would be concrete and procedural.

Dr. Ball stressed the importance of construct validity. Dr. Reyna said that the document addressed validity and reliability but does not break down the kinds of validity. She said she was open to circulating the document and asked panelists to add any language operationally defining construct validity.

Dr. Siegler said that the top tier requirements should also specify some intermediate cases so that not only ideal but also very good studies could be included. Dr. Benbow added that the evidence classification is solely for the purpose of making clear the kind of inferences that can be drawn and whether causality can be determined. It is not a judgment on the quality of the study; the paper should reflect that. Dr. Siegler said that there are excellent studies that do not naturally fall into the top or second tier, so he wanted to see them as a subcategory of the top tier. Dr. Faulkner said that the middle category seemed too wide. Dr. Ball expressed concern with the looseness of the categories, and she wanted panelists to structure their discussions to the guidelines. Dr. Gersten stressed the importance of segregating the levels of evidence in meta-analyses, adding that even below bottom level evidence is invalid evidence.

Dr. Stotsky said that it is important to look at the specific questions each task force is tasked with and not restrict the answers to experimental studies in the hierarchy, since some questions may be answered in different ways. Dr. Reyna said the document should mean that, but she is open to any relevant language.

Dr. Loveless added the importance of thinking in terms of cost/benefit analyses, since an excellent study or intervention no one can afford to do is worthless. Dr. Reyna said that the document was stressing effectiveness over cost, and cost might be addressed in a different document.

### **TASK GROUP ON CONCEPTUAL KNOWLEDGE AND SKILLS: FRANCIS “SKIP” FENNELL**

Francis Fennell, Wilfried Schmid, Liping Ma, and Larry Faulkner are the members of the Conceptual Knowledge and Skills Task Group. Dr. Fennell chair of the task group, said that his group was close to a consensus on essential concepts and skills, pre-K through 8 and was working on defining algebra. Dr. Fennell expressed the hope that the Panel would put out a template for a national curriculum. Definitions of algebra in the frameworks of the states and other countries are being looked at. Dr. Faulkner noted that this task group (of which he is a member) had not discussed the question of a national curriculum and that Dr. Fennell was speaking personally on that point.

Dr. Loveless pointed out that a national curriculum may offend the state and local bodies, which provide the majority of the funding. Dr. Fennell said that it may, but the idea of a template is

worth talking about. Dr. Schmid said that a template is the same as Focal Points and would probably be acceptable, but going further can be dangerous. Dr. Ball said that the Panel has to point to the aspects of the system that made the Panel necessary. The Panel was created to prompt change, and there should be discussion of the arguments for and against a national curriculum and what a national curriculum means. Dr. Loveless said that political feasibility should be examined before recommendations are made. Dr. Stotsky said that there are precedents of the federal government affecting education. One way to address the issue is through recommendations on teacher education. An enforcement method is to put conditions on federal funding. The Panel, however, must not exceed its mandate. Dr. Faulkner explained that the Panel's recommendations will be evidence-based, not politics-based, and the political work required to implement the recommendations is not to be specified by the Panel.

Dr. Wu argued that defining algebra is an intellectual problem that does not require surveying what other states and countries do. You can say that school algebra is the mathematics of rational numbers with some peculiar rules about what to do with irrationalities, and the grades leading up to algebra deal only with rational numbers. Intensive symbolic use is the main characteristic of school algebra, leading to proofs, which require general reasoning. One can say what it is and what needs to be done. For example, algebra is difficult to understand without geometry and it is often taught by memorization without understanding. The definition should be made in order to define a goal, and then other systems can be looked at to determine implementation.

#### **TASK GROUP ON LEARNING PROCESSES: DAVID GEARY**

David Geary, Valerie Reyna, Wade Boykin, Daniel Berch and Robert Siegler are the members of the Learning Processes Task Group. Dr. Geary, chair of the task group, said the group has been outlining its goals as follows: (1) to provide information on what a child should know going into school and through kindergarten, (2) to explore the differences in knowledge the children enter the system with across diverse groups, and (3) to provide basic information on human memory and its development and the development of procedural and conceptual competencies. This information will then be applied to a number of content areas to draft reports of children's perceptual skills, conceptual development, and learning difficulties with fractions, decimals, and rational numbers. The task force will also work on the topic of whole number arithmetic, looking at the learning of basic facts and algorithms, relationships between conceptual and procedural understanding, and non-cognitive factors that influence learning such as motivation, culture, and affective factors.

Dr. Berch commented that the fact that the task force is looking at memory should not imply that the Panel is endorsing rote memorization. Dr. Geary agreed elaborating that factual memory is only one facet of memory. Competence in multi-step problems involves many types of memory and many mathematical skills. His group hopes to define the different types of memory and identify their involvement in different types of learning.

#### **TASK GROUP ON INSTRUCTIONAL PRACTICES: RUSSELL GERSTEN**

Russell Gersten, Camilla Benbow, Vernon Williams, Thomas Loveless, Diane Jones, and Kathie Olsen are members of the Instructional Practices task group. Dr. Gersten, chair of the task group, said his group has decided not to come up with a quick project. Instead, they want to look at what is explicit instruction and effective instruction and what activities make sense in a math



curriculum. The investigation into the evidence should include talks with experts and research reviews.

Dr. Reyna asked if the group would look at data-supported effective practices. Dr. Gerstein said that was what they were looking for, not only to find ineffective practices and debunk them but also find effective practices and evaluate them by meta-analysis. He said they were looking at multiple issues, including homework and learning disabilities. They are not looking into leadership and administration, since that is outside of their scope. Dr. Schmid said some topics do not fit neatly into any of the task forces and the Panel should address that. Dr. Faulkner suggested addressing that after the first report was finished. Dr. Gerstein said that he did not want to see things like leadership thrown in at the last minute, since there would be no time to handle the subject well. Dr. Loveless added that current federal policy is missing from the report. The National Assessment of Educational Progress (NAEP) and NSF should not be ignored by a federal panel. Dr. Boykin said that this task force is supposed to work with instructional practices, materials, and programs, and materials and programs should be more directly addressed. Dr. Gerstein said they would be reporting from the What Works Clearinghouse to address that.

Ms. Jones said that she did not think it was the Panel's role to advocate a particular brand-name curriculum. The Panel should look at the research and see what methodologies and components work where and when. Dr. Gerstein said the curriculum issue merits further discussion in the task group.

#### **TASK GROUP ON TEACHERS: DEBORAH BALL**

Deborah Ball, Nancy Ichinaga, James Simons, Sandra Stotsky, Hung-Hsi Wu, Grover "Russ" Whitehurst, and Ray Simon are members of the Teachers task group. Dr. Ball, chair of the task group, said that her group would be looking at the problem of creating a mathematically qualified professional work force. There are three big issues centered on reviewing the research on teachers' mathematical knowledge: (1) reviewing research on programs related to pipeline, retention, and rewards issues; (2) professional training pre-service and in-service as well as licensure exams. Included in this is evidence linking a mathematically qualified workforce to effectiveness, determining what kind of math knowledge a teacher needs, and exploring differential staffing at the elementary level. The model recommended should not require a burdensome number of math specialists. There is also the question of the quality and nature of effective pre-service and continuing teacher education; (3) teacher evaluation and comprehension and how it relates to performance and effectiveness. The focus is on the building of a mathematically qualified professional work force with an emphasis on the mathematical knowledge needed, the recruitment, retention, reward structure, as tied to practice and performance, and professional training itself.

Mr. Williams asked how much the administration and intellectual atmosphere plays a role, and Dr. Boykin asked about the effectiveness of alternate routes to the teaching profession. Dr. Ball said those would be looked at under the heading of recruitment and retention.

#### **ADJOURNMENT**

Dr. Faulkner said that the Panel has made substantial progress and reminded the Panel and audience that the next meeting will be in Palo Alto on November 5-7. The January meeting will be in New Orleans, January 10 and 11. The Panel adjourned at 12:28 p.m.

**I certify the accuracy of these minutes.**

**Chair's Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Vice Chair's Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**ADDENDUM: PUBLIC PARTICIPANTS**

<b>Last Name</b>	<b>First Name</b>	<b>Organization</b>
Allen	Angela	Public Schools of Brookline
Alves	Michelle	Digi-Block
Bailey	Rebecca	The Algebra Project
Barnes	Betty	Carnegie Learning
Baughman	Marcy	Pearson Education
Beckmann	Sybilla	University of Georgia
Beers	Jack	Metropolitan Teaching and Learning Company
Bickerton	Bob	Massachusetts Department of Education
Birch	Emily Michie	Heinemann Math and Science Greenwood Heinemann Publishing
Bisk Ph.D.	Richard	Worcester State College
Blaunstein	Phyllis	Widmeyer Communications
Bradley	John	NSF
Buell	Nancy H	Association of Teachers of Mathematics in Massachusetts
Burke	Laurie W.	Cambium Learning
Chapin	Suzanne	Boston University
Chen, Ph.D.	Andrew	EduTron Corporation
Christiansen, Dr.	Per	Massachusetts Department of Education, Student Assessment Services
Clements	Douglas H.	University At Buffalo, State University Of New York
Collins, Ph.D.	Anne	Association of Teachers of Mathematics in New England (ATMNE)
Concannon	Holly	Murphy School, Boston Public Schools
Connell	Michael	Dartmouth College

<b>Last Name</b>	<b>First Name</b>	<b>Organization</b>
Crotti	Patti	California Comprehensive Center at WestEd
Crouch, III	Cecil	PA Training and Technical Assistance Network
Davenport	Linda	Boston Public Schools
Dieffenbach	Jeff	Wayland School Committee
Dillender	Cathie	Pearson Scott Foresman
Dockterman	David	Tom Snyder Productions and Harvard Graduate School of Education
Driscoll, Ph.D.	Mark J.	EDC, Inc. (representing TODOS and NCSM per Miriam Leiva and Linda Gojak)
Eich	Mary	Newton Public Schools
Fernald	Wayne	Student Assessment Services, Massachusetts Department of Education
Ferrini-Mundy	Joan	NSF
Ficca	Tracy	Pennsylvania Department of Education
Findell	Carol	Boston University
Findlen	Sean	Weber Shandwick
Finkel	Stacey	Widmeyer Communications
Fitzgerald	Ted	Boston Herald
Flanagan, Ph.D.	Kristin	Education Statistics Services Institute
Flattau, PhD	Pamela Ebert	IDA Science and Technology Policy Institute, Social and Behavioral Sciences and Education
Fortmann	Thomas E., Dr.	Mass Insight Education
Fraser	Alison L.	Mass Insight Education
Freeman	Haley	Student Assessment Services, Massachusetts Department of Education
Freeman	Haley	MA Dept of Education
Garfunkel	Solomon	Consortium for Mathematics and its applications (COMAP)
Gendler	Joel	Victory Productions
Ginsburg	Herbert	Columbia University Teachers College and Wireless Generation
Godfrey	Lynne	Cambridge Public Schools Kennedy/Longfellow School, Room 201
Greenes	Carole	Boston University

<b>Last Name</b>	<b>First Name</b>	<b>Organization</b>
Halber	Deborah	MIT
Hamada	Lori	Sacramento County Office of Education
Heching	John	Wall Street Journal
Helon	Margaret	Wayland
Hoang	Cvong	Philanthropic Advisors
Horrigan	Holly	Mathematician and Parent
Howard	Phillip	Independent
Hughes	Dr. Anne O.	Retired - University of the District of Columbia
Jackson	Neelia	Boston Public Schools
Jan	Tracy	Boston Globe
Johnson	Mark	Student Assessment Services, Massachusetts Department of Education
Johnston	George L.	EduTron Corporation
Judson	Thomas	Harvard University
Kalinowski	Melissa	PLATO Learning
Kastner	Marcia	Student Assessment Services, Massachusetts Department of Education
Keller	Zoe	TERC
Khatri	Dr. Daryao S.	University of the District of Columbia
Klugerman, Dr.	Michael	Mass Insight Education
Knowles	Marianne	Great Source Education Group (a division of Houghton-Mifflin)
Kra	Irwin	Math for America
Krehbiel	Ken	National Council of Teachers of Mathematics
Lamb	Todd	Dutko Worldwide
LeBron	Hunter	Young People's Project
Lehnertz	Elizabeth	Pearson Prentice Hall
Leshnock	Darlene	McGraw-Hill Glencoe
Littlewood	Susan	Victory Productions
Long	Donna J.	Macmillan/McGraw-Hill
Lucas, Jr.	Harry	Educational Advancement Foundation

<b>Last Name</b>	<b>First Name</b>	<b>Organization</b>
Madsen	Grace	Samuel Adams School Boston Public
Martinek	Larry	Mathnasium
Martinez	Alina	Abt Associates Inc.
Mayer	Ken	TERC
McCarron	Kari	MIT Washington Office
McKelvey	Lynda	Sopris West Educational Services
McLaughlin	Nancy	Cambridge Public Schools
Milner	Chad	Young People's Project
Milner	Khari	CPSD
Mitchell	Nyema	IDA Science and Technology Policy Institute, Social and Behavioral Sciences and Education
Mitchell	Sally	Syracuse University- School of Education
Moynihan, M.Ed.	Benjamin	Algebra Project Inc.
Nissen	Lila	Holt, Rinehart and Winston
Ocken	Stanley	Department of Mathematics, The City College of C. U. N. Y.
O'Hearn	Jane	US Department of Education
O'Reilly	Fran	Abt Associates
Orrell	Cindy J.	Houghton Mifflin Company
Owen, Dr.	Lisa	Rhode Island College
Page	Maurice	Wheelock College
Park	Frederick	Cambridge Public Schools
Peck	Ann	WGBH
Penfold	Angela Noll	RMC Research Corporation
Peresman	Claudia	Wright Group - McGraw Hill
Personnat	Egbert	MA Dept of Education
Pettigrew	Joan	Independent Consultant
Pittock	Janet	Scholastic
Porras	Victoria	Victory Productions
Porzio	Joseph	Math Resource Center

<b>Last Name</b>	<b>First Name</b>	<b>Organization</b>
Reynolds	Jim	Harcourt School Publishers
Richmond	Margie H.	Pearson Learning Group
Rickhoff	Rick	SRA/McGraw-Hill Companies
Roebke	Joshua	Seed Media Group
Rogalski	Susan	Great Source Education Group
Rosenberg	Steven	Boston University
Russell	Susan Jo	Education Research Collaborative, TERC
Saxberg	Bror	K12, Inc.
Schielack, Dr.	Jane F.	Texas A&M University
Schmitt	Mary Jane	Adult Numeracy Network
Shein-Gerson	Debbie	Weston Public Schools
Simons	Jeanne	MA Dept of Education
Spiegel	Wendy	Pearson Education
Szaniszlo	Marie	Boston Herald
Trow	Marilyn	Director, Math Product Management, Harcourt Achieve
Tsankova, Dr.	Jenny	ATMIM, Association of Teachers of Mathematics in Massachusetts
Umpfrey	Lee C.	Math for America
Van Wassenhove	Doug	McDougal Littell/Houghton Mifflin Company
Waight, Ed. D.	Mary M.	Independent
Ward	Julie	Cambridge Public Schools
Weidevaar	Jeff	Pearson Education
Wendorf	James H.	National Center for Learning Disabilities
West	Mary	Lesley University
Whiting	David	McGraw-Hill
Wilkinson	Bill	Harcourt Achieve
Willis, Ph.D.	Christine E.	Cambium Learning, Inc.
Wontan	Karen	Community and Family Engagement Training Center, Boston Public Schools
Wood	Stewart	Pearson Prentice Hall

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Zeno	Barbara	Math Resource Center