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RESEARCH IN MATHEMATICS EDUCATION

Technical Advisory Board Report: 2018 Summary

Technical Advisory Board Report: 2018 Summary

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Abstract

In this report, the Research in Mathematics (RME) team summarizes the meetings held with the Technical Advisory Board (TAB) for the Measuring Early Mathematical Reasoning Skills (MMaRS) project in 2018. We provide an overview of the meeting purpose, goals, participants, and a summary of the discussions, including recommendations made by the TAB and the actions taken by the RME team.

Table of Contents

Technical Advisory Board Report: 2018 Summary

Introduction

The primary goal of the Measuring Early Mathematical Reasoning Skills (MMaRS) project is to create formative assessments of numeric relational reasoning (NRR) and spatial reasoning (SR) for students in grades K-2. Teachers may use results of these assessments to guide their instructional decision making to support student learning of these constructs.

One component of this research project is to engage experts in the field to solicit their input on the research and development activities planned for the study. As such, the RME team began working with six experts who serve on the Technical Advisory Board (TAB) and hosted the first in-person meeting held in the spring of 2018 at Southern Methodist University. In this report, we provide an overview of the meeting's purpose, goals, participants, and a summary of the discussions, including recommendations made by the TAB and the actions taken by the RME MMaRS project team.

Purpose and Goals

The role of the TAB includes two primary purposes:

- Provide input on research and development activities
- Provide input on research designs across phases of the project, more specifically,
    - Provide input on construct definition
    - Provide input on research designs across phases of the project

The RME research team built the first in-person meeting with the TAB around these purposes. The agenda for the 2018 meeting encompassed two days and is presented in Table 1.

On the first day of the 2018 meeting, the MMaRS principal investigator Dr. Leanne Ketterlin Geller formally introduced the RME project team and the TAB. She also reviewed the goals, phases and high-level timeline for the MMaRS research project. The MMaRS project goals presented included:

- Primary aim: Develop and gather validity evidence for a *universal screening* assessment system measuring:
    - Numeric Relational Reasoning (NRR)
    - Spatial Reasoning (SR)

- Secondary Aims:
    - Understand students' *thinking and reasoning* around constructs
    - Support teachers' *decision making*
    - Inform teachers about the *importance* of these constructs

Table 1

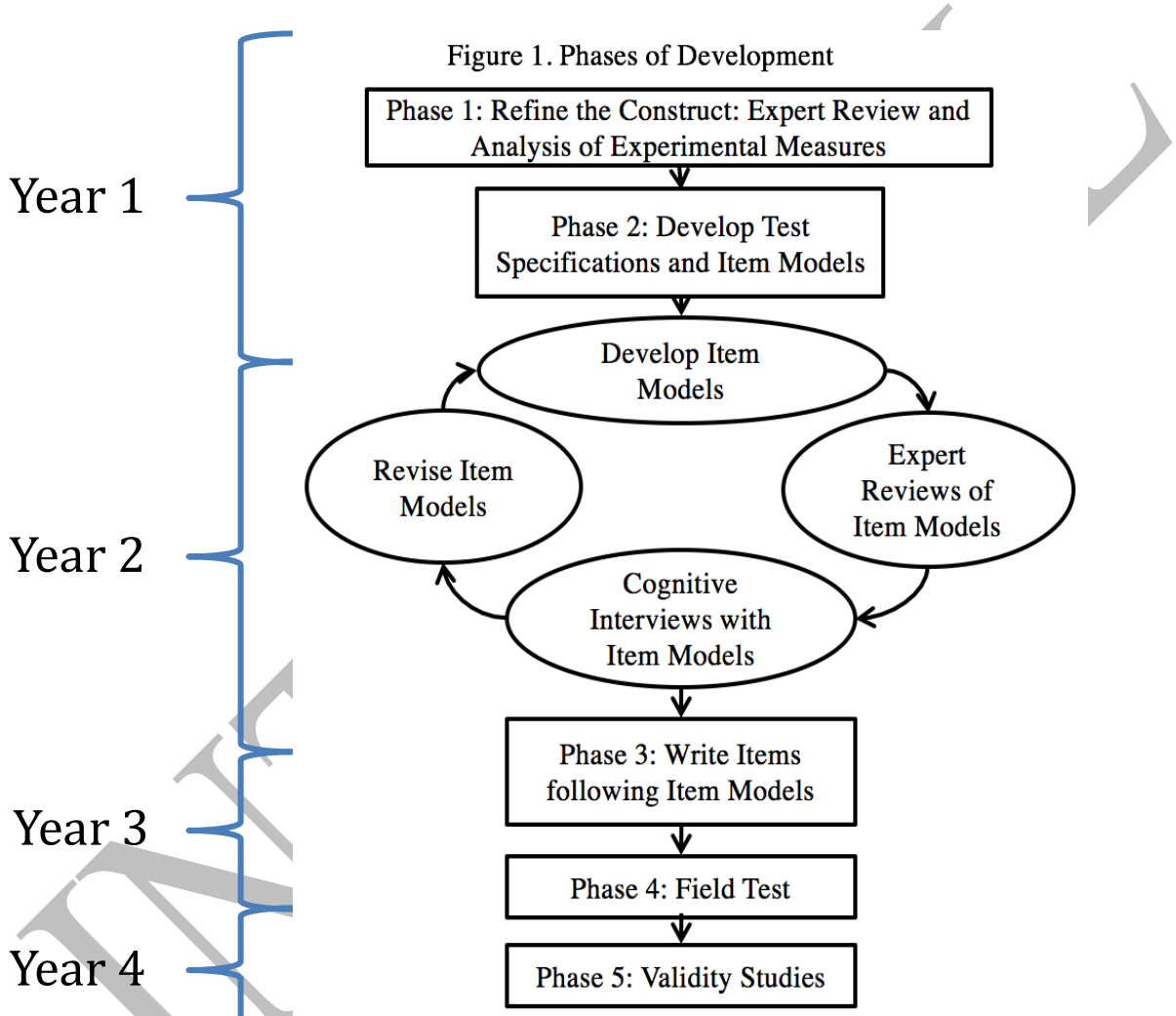
MMaRS TAB Schedule for March 1-2, 2018

Date	Time	Activity
Thursday March 1	2:00pm	Meet at SMU • Introductions of the Technical Advisory Board and SMU Project Team
	2:15pm	Overview of the project
	3:00pm	Review the construct definitions • Numeric relational reasoning • Spatial reasoning
	4:00pm	Adjourn
	6:00pm	Dinner
Friday March 2	8:30am	Breakfast
	9:00am	Discuss and solicit input on research activities for Phase 1 • Development and finalization of construct definitions • Develop item models • Content and bias review panels Discuss and solicit input on research activities for Phase 2 • Cognitive interviews • Finalize item models
	10:30am	Break
	11:00am	Discuss and solicit input on research activities for Phase 3 and 4 • Finalize Item writing and review procedures • Validity studies
	12:00pm	Lunch
	12:30pm	• Discuss outstanding questions on technology platform, content and test blueprints, involvement of practitioners • Next steps and meeting schedule for TAB
	1:00pm	Adjourn • Dr. Gersten to provide input on construct definitions

At the time of the first TAB meeting, the MMaRS project included five phases over the course of the four-year project. The RME team presented the project overview and timeline shown in Figure 1 to the TAB on the first day of the meeting.

Figure 1

MMaRS Project Overview and Timeline



The first TAB meeting focused on (a) phase 1: refine the construct and (b) phase 2: develop test specifications and item models.

Participants

Five members of the RME MMaRS project team and four members of the TAB attended the meeting on March 1-2, 2018.

RME Project Team

The RME project team at the March 1-2, 2018 meeting included:

- Leanne Ketterlin Geller, PhD
- Lindsey Perry, PhD
- Josh Geller
- Marilea Jungman
- Cassandra Hatfield

Dr. Ketterlin Geller also noted Paul Yovanoff, PhD, Diego Roman, PhD, and Tony Cuevas, PhD, as SMU collaborators on the project.

TAB Members

Six experts serve on the MMaRS Technical Advisor Boarding including:

- David J. Chard, PhD (President, Wheelock College)
- Doug Clements, PhD (Kennedy Endowed Chair and Professor, University of Denver)
- Jere Confrey, PhD (Joseph D. Moore Distinguished University Profession, NC State University)
- Jan de Lange, PhD (Past-chairman/director of the Freudenthal Institute and Professor, University of Utrecht in the Netherlands)
- Lynn Fuchs, PhD (Dunn Family Chair in Psychoeducational Assessment, Vanderbilt University)
- Russell Gersten, PhD (Executive Director, Instructional Research Group)

Drs. Jere Confrey, Jan de Lange, and Russell Gersten attended the two-day meeting in person and Dr. Lynn Fuchs participated virtually. Drs. David Chard and Doug Clements were not able to attend the meeting. More detail about each of the TAB members' experience and expertise is included in Appendix A.

Meeting Discussion

Thursday, March 1, 2018.

After the team introductions and discussion of the project goals, Dr. Ketterlin Geller presented the following initial test specifications for the MMaRS assessments:

- Intended test takers: students in grades K-2
- Test format: individually administered
- Test time: maximum of 20 minutes
- Delivery mechanism: tablet-assisted administration.

The presentation continued with Dr. Ketterlin Geller walking the group through the proposed phases, associated tasks, and high-level timeline. She explained the following topics under phases 1 and 2, planned for the first two years of the project:

- Phase 1:
    - Conducted extensive literature review on previous research
    - Refined constructs based on learning theories
- Phase 1 Products:
    - Annotated bibliography of constructs and assessments
    - Meeting reports (Consultants and TAB)
    - Literature review on constructs for publication
    - Description of constructs for practitioners
- Phase 2:
    - Construct definition
    - Item statistics
    - Leads to test specifications and item models that really elicit the underlying constructs. Building on what has been successful but remaining innovative.
- Phase 2: Review of experimental items
    - Came out of Early Grade Mathematics Assessment (EGMA)
    - Response To Intervention (RTI) panel uncovered that some of the subtasks needed to go deeper.
        - Relational reasoning
        - Spatial reasoning (Visualization and two-dimensional)
- Phase 2 Products:

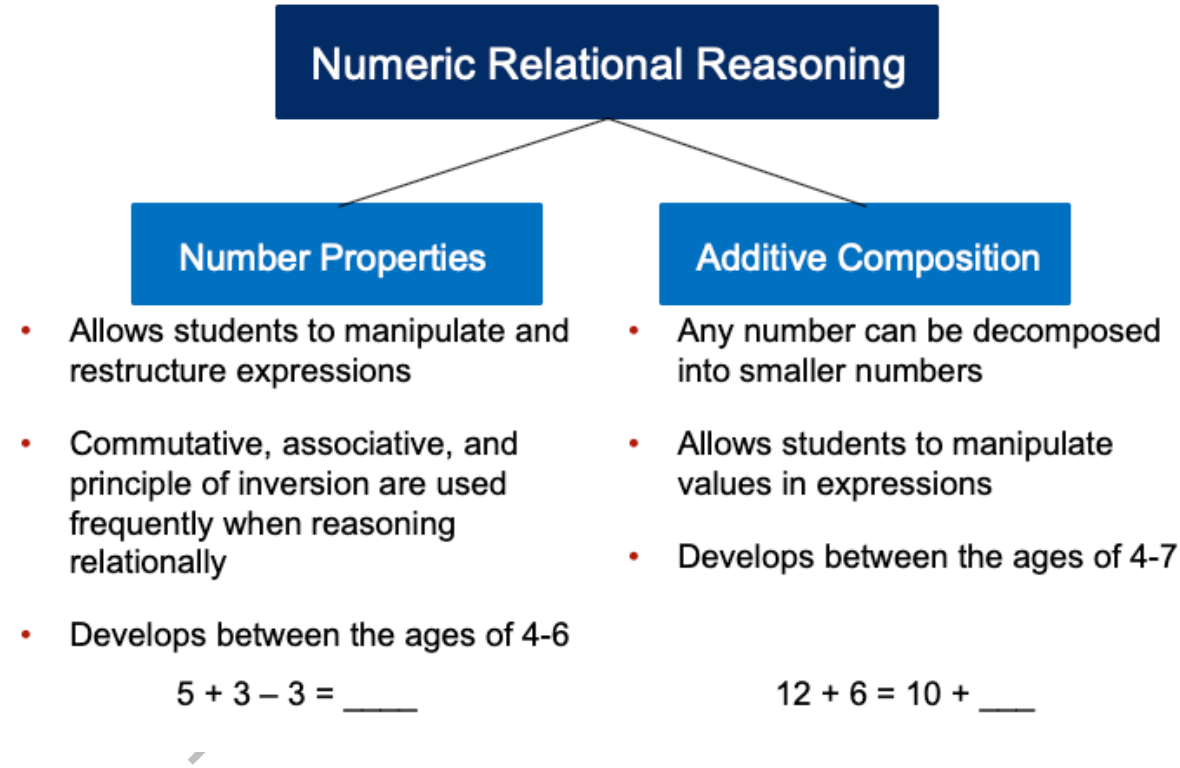
- Technical reports and documentations
- Operationalized construct for test development

Construct Definitions

Dr. Ketterlin Geller presented the construct definition for Numeric Relational Reasoning (NRR). According to Dumas, Alexander, and Grossnickle (2013) relational reasoning is the "ability to recognize or derive meaningful relations between and among pieces of information that would otherwise be unrelated" (p. 392). NRR is the ability to mentally analyze relationships between numbers or expressions, often using knowledge of number properties, decomposition, and known facts (Baroody, Purpura, Eiland, Reid, & Paliwal, 2016; Carpenter, Franke, & Levi, 2003; Farrington-Flint, Canobi, Wood, & Faulkner, 2007; Jacobs, Franke, Carpenter, Levi, & Battey, 2007). The NRR construct presented is shown in Figure 2.

Figure 2

Numeric Relational Reasoning Construct Definition



Note. Sources: Bryant et al., 1999; Canobi et al., 2002; Carpenter et al., 2005; Cowan & Renton, 1996; Farrington-Flint et al., 2007; Koehler, 2004; Molina et al., 2006; Nunes et al., 2007; Piaget & Inhelder, 1969; Rasmussen et al., 2003; Sarama & Clements, 2009; Siegler, 1987; Sophian, 2007; Sophian & McCorgray, 1994

The RME project team posed the following questions to the TAB about the NRR construct:

1. Did we capture the main components?

2. Are there aspects of the main components, including the subcomponents, that we did not capture?

3. Are there pre-requisite skills to these main components that might be relevant to Kindergarten learners?

4. Are there additional seminal articles that we should include?

In response, TAB members noted the importance of relations for NRR and order as the most basic relation. The transitive property is important for children to begin to see the other relations. Pre-requisite skills include how quantities relate to each other for relational thinking. TAB noted they did not see equal partitioning and multiplicative reasoning within the construct and offered to assist with these components. The TAB encouraged the RME team to think about decomposition as "baby factors." In other words, when students are doing "fair sharing" exercises they are demonstrating equipartitioning skills. The TAB also asked about the additive inverse and additive identity, which she noted should be in the properties based on the inverse relationship between addition and subtraction. The TAB suggested using the full definition, including the inverse operation which they emphasized is essential to NRR.

Dr. Ketterlin Geller moved on to the second construct definition, Spatial Reasoning (SR). She explained SR is the ability to reason within space and within one's environment. The SR construct moves beyond geometric concepts and requires mental interaction or manipulation of a figure or space. The RME team presented the Figure 3 graphic to illustrate spatial visualization and spatial orientation within the SR construct to the TAB.

The RME team posed the same four questions to the TAB about the SR construct:

1. Did we capture the main components?

2. Are there aspects of the main components, including the subcomponents, that we did not capture?

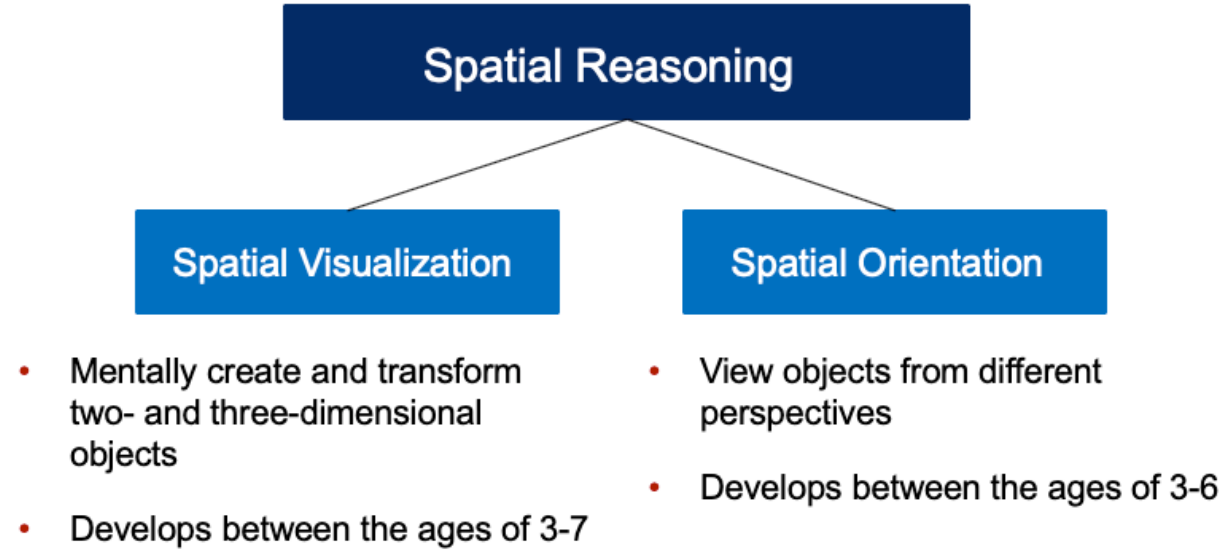
3. Are there pre-requisite skills to these main components that might be relevant to Kindergarten learners?

4. Are there additional seminal articles that we should include?

5. The TAB asked about scaling and recommended the RME team confirm that the fundamental multiplicative base exists to support all the other components and subcomponents. The TAB led a discussion around rotations and reflections and noted Natalie Sinclair is reviewing apps that incorporate these skills including Touch Counts and Meta-bets. The TAB suggested including patterns and recommended reviewing the book, *Mathematics: The Science of Patterns,* for more guidance.

Figure 3

Spatial Reasoning Construct Definition



Note. Sources: Bishop, 1980; Blaut & Stea, 1974; Burnett & Lane, 1980; Clements & Battista, 1992; Connor & Serbin, 1980; Dalke, 1998; Eliot & Smith, 1983; Marmor, 1975; McGee, 1979; Michael et al., 1957; NRC, 2009; Pellegrino et al., 1984; Perham, 1978; Sarama & Clements, 2009; Tartre, 1990

General Discussion

Two points of general discussion emerged that were not specifically related to either construct but were important conversations between the RME team and the TAB. The incorporation of technology was discussed, specifically whether it would be used for scoring or as a child-facing interface. Questions about the use case for the assessment were also discussed. Comments from the TAB and responses for the RME team are next described.

Technology. One TAB member asked the RME team about their plans to administer the assessment on an iPad or tablet. The member asked whether the team plans to take a paper and pencil assessment and then build it into an iPad format or if the RME team is exploring new ways to assess utilizing iPads. Another TAB member cautioned that assessment items change when they are transposed from a paper format to a screen. Dr. Ketterlin Geller responded that there has been a lot of discussion about how to approach the delivery of the assessment. She noted that the project is currently targeted at using the iPad or tablet interface largely with the assessor, rather than child-facing.

Use Case. TAB members asked if the specific purpose of the MMaRS assessment tool was to identify students whose NRR for grade level requires instructional attention. Dr. Ketterlin Geller replied that the purpose of the assessments is to identify children early for not developing reasoning skills that researchers know are precursors to algebraic reasoning. The TAB expressed

concerns if a child fails to screen or shows poor performance this may reflect undeveloped math skills to support relational reasoning. They thought it is possible to work on NRR with manipulatives but cautioned that some of the items are pretty sophisticated related to relations. The TAB suggested including a better explanation of the relations construct and noted the most basic of relations is order.

The RME team ended the presentation on March 1st with some closing questions about additional considerations for instrument development and noting that day two of the meeting would focus on research designs for the MMaRS project. The posed the following considerations for potential instrument development:

- How can we integrate "smart play" in instrument development?
- What are the role of interviews in instrument development? How can we use rubric-based scoring to evaluate the levels of students' reasoning?
- How can we triangulate information about students' responses by varying items or item formats, and then aggregating their responses? (e.g., concrete, visual, and abstract representations).

Research Activities and Questions

Friday, March 2, 2018.

On the second day, the RME and TAB team discussed the MMaRS research activities planned for phases 1-4, future directions, next steps, and upcoming TAB meetings. Dr. Ketterlin Geller reviewed the project overview and timeline and posed the following questions about the research activities to the TAB:

- What similar work have you done in the past that has worked well?
- What challenges have you encountered? How have you overcome these roadblocks?
- Sample:
    - What additional considerations do we need to think through for working with this population?
    - Consideration about the sample size and sampling plan
- Procedures
- Analysis
    - How have you approached the analyses of similar data?
    - What considerations do we need to think through for the analyses?

These questions functioned as fluid conversation stems that the RME team then organized the TAB responses to these questions around several themes.

Teacher Engagement in the Research Design

The TAB suggested that teachers be included in the development phases of the project so that multiple approaches to assess children are queried. They noted that researchers and assessment developers often underchallenge students. Some concrete examples are too simple and some abstract examples (symbolic notation) are too difficult. The TAB agreed that some teacher input would be good because many times a teacher can frame things in a more child-friendly way that is both captivating and motivating to the students. One member cautioned that teachers might have difficulty with the research terminology and concepts discussed in the consultant meetings suggested that teachers be included in a parallel meeting.

The TAB advised RME to consider teachers as part of the use case. For example, when teachers have the assessment data, how will they use this information to change instruction? One member reinforced an earlier point and said a teacher who truly loves teaching math may give input that is very valuable. The TAB recommended starting small and building a teacher team as an ongoing focus group to gather feedback from teachers throughout the project development phases.

Informal Learning

The TAB noted they would like to see a list of items that connect to classroom practice. One member commented that by the age of four or five years old, children have years of learning informally, so how does the RME team connect that informal learning? The RME team must have some kind of expectation on what kind of reasoning we will see or measure. It was also noted by one TAB member that they would expect to see the same item but on different levels or learning progressions. They specifically discussed task components being designed to elicit reasoning and making students' cognitive operations and reasoning visible and observable.

Rubric-Based Scoring

Dr. Ketterlin Geller asked the TAB about their thoughts on rubric-based scoring to evaluate levels of reasoning. She noted the MMaRS product is meant to be a formative assessment and if the RME research team needs to provide training on the reasoning behind a rubric that will be difficult. The TAB discussed assignment of points, including partial credit, and the complexity associated with classifying and scoring student responses, specifically when responses are vague and imprecise. The TAB shared concern with the team over the time needed to score in this way, and ways that children's' opportunity to learn and socioeconomic status may impact scoring in ways that are aligned with the context rather than the content and reasoning.

Creating the Content Blueprint

One TAB member asked Dr. Ketterlin Geller what it means to locate someone in a level of reasoning. Dr. Ketterlin Geller responded she's thinking of less complex to more complex

reasoning, as shown in the assessment content and test blueprint in Figure 4. The TAB thought of ways for the team to think of this progression as an initial exploration, the call to action for students to reason, students demonstrating reasoning in more than one way, and demonstrating generalizability of that reasoning frame. By examining the levels of reasoning using concrete, visual, and abstract representations in a continuum from least to most complex within the learning progressions, the content and blueprint could align with advancing skill and reasoning.

Figure 4

Content and Test Blueprint

	Relations			Number Properties			Additive Composition		
Most complex	C	V	A	C	V	A	C	V	A
Least complex									

	Relations	Number Properties	Additive Composition
Abstract			
Visual			
Concrete			

Elicit Reasoning and Make it Visible

The TAB urged the RME team to make reasoning visible. For example, think of a collection of mosaic tiles as concrete objects. The first question posed could be "which belong to each other?" with an exercise of shape sorting to put circles with circles, squares with squares, etc. But this exercise could also be classifying by color. Another question might be "are there more squares than circles?" Some students will count to arrive at the answer and others will match through sorting, which are two very different strategies. One TAB member added that children's language will be behind their mathematical thinking.

Bias and Culture

The TAB emphasized the importance of accounting for culture and bias in the items. One member noted it is interesting from a psychometric point of view to remove culture from items which is intertwined with language, yet one cannot disembed from culture if you want the reasoning to be constructive. The TAB specifically gave recommendations to remove construct

irrelevant variance from the assessment, such as knowledge specific to suburban children while including opportunities for children to demonstrate reasoning based on their own experiences. Using children's experiences with the tasks through cognitive interviews would provide a source of evidence for what contexts children are and are not comfortable with and the language that is or is not appropriate for assessors to use. The TAB pushed the RME team to think about correctness and relevance to ensure that outcomes of the assessment are worthwhile for teachers and children.

Cognitive Interviews

The RME team and TAB discussed the cognitive interview activities, including two different types of think alouds: concurrent and retrospective. In concurrent think alouds the observer tries to elicit the students to verbalize their thinking. In a retrospective, the interviewer is asking direct questions. One TAB member asked if the RME team had considered piloting the cognitive interviews with five-year-olds before starting the formal process. Another TAB member added that retrospectives will not be retrospective. This member has used clinical interviews for teaching experiments to understand how teachers are thinking about the ideas based on the set up of the tasks. The team could rely on clinical interviews for constructs that are under developed before diving into item development and use the clinical interviews for broader ideas around reasoning. One TAB member suggested trying the numeric protocol first and utilize two versions for spatial reasoning because the RME team is less certain. Another TAB member agreed and cautioned that from the teacher perspective, the components may need to be simplified.

The discussion continued about the tension between instructional questioning and assessment questioning. The TAB suggested the interviews be open and simpler by adjusting the prompts to better elicit responses from young children. They emphasized the importance of rich responses rather than asking more and more questions. The TAB thought teachers' input may be especially helpful, to adhere to a small number of items which is better representative of formative classroom assessments. They reminded the RME team that the purpose of the assessment is to inform teachers' instruction rather than to place students in bins. The interviews should strike a balance between rich tasks and their responses with time as a constraint because teachers need value from students' responses but cannot spend excessive time administering this assessment.

Eye Tracking and Executive Functioning

Next, the RME team and the TAB discussed additional research-related activities such as eye tracking, building in methods to evaluate children's executive functioning, and ways to build in teacher input and feedback to increase the impact on teachers' practice. One TAB member was more interested in giving young students an open task on a tablet so that the research team may glean insight and data directly from the students' actions rather than relying on obtaining data from the interviewer or indirect approaches such as eye tracking. And another TAB member thought executive functioning on its own is not a strong predictor of variability around some of the tasks. Occasionally, students with weak working memory needed more time and concept practice. But another TAB member was not sure if it is important or relevant to the MMaRS project.

Next Steps

The day ended with a short overview of the RME team's dissemination plans and a discussion around continued collaboration. The team agreed to periodic updates as well as systematic annual updates, with in person meetings every other year and brief conference calls each spring. The RME team decided to share electronic data and reports with the TAB prior to conference calls to facilitate deeper discussions.

Summary of TAB Recommendations

Over the course of the two-day meeting, the TAB provided the following recommendations for the MMaRS project team to consider:

1. Consider the assessment delivery format and the differences between traditional paper-and-pencil and tablet/iPad assessments.

2. Include more a comprehensive explanation of the NRR construct, including numerical order, equipartitioning, multiplicative reasoning, and the inverse operation.

3. Confirm that the fundamental multiplicative base exists to support the components and subcomponents of the SR construct. Review apps that may be helpful for SR. Include patterns and review the book, *Mathematics: The Science of Patterns*.

4. Engage a team of teachers to provide feedback for the RME team during key phases of development.

RME Actions

The RME project team reflected on the recommendations provided by the TAB and implemented the following actions based on their suggestions:

1. The RME solicited nominations from Dallas-Fort Worth area school leaders and formed a Teacher Advisory Panel to provide input and guidance from the practitioners' perspective about the use case of the formative assessments.

2. Revising and updating the use case

3. Revising and updating the content basis for the assessment to focus on learning progressions

4. Shared the information about the construct definitions into the meetings with consultants to update the definitions and learning progressions

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Appendix A – MMaRS Technical Advisory Board

David J. Chard, PhD
President
Wheelock College

David J. Chard, Ph.D., became Wheelock College's 14th President on July 1, 2016. He was previously Dean of the Annette Caldwell Simmons School of Education and Human Development at Southern Methodist University (SMU), where he created a strategic vision focused on undergraduate and graduate programs built on evidence-based practices.

Among his accomplishments at SMU were developing a qualified and diverse faculty, strengthening interdisciplinary collaborations, building new academic programs and fostering a positive culture. During his 10-year tenure, the Simmons School grew to include five departments with an operating budget of over $25 million and more than $60 million was raised in support of the school and its mission.

Dr. Chard holds a Ph.D. in special education from the University of Oregon and a B.S. degree in mathematics and chemistry education from Central Michigan University. He has held faculty positions at Boston University, the University of Texas at Austin and served as associate dean in the College of Education at the University of Oregon. At Oregon, he oversaw curriculum and academic programs in the College of Education.

Dr. Chard has published more than 100 articles, monographs, book chapters, and books. He is a member of the International Academy for Research in Learning Disabilities, and has served in leadership roles in numerous professional organizations. Prior to his becoming dean, Dr. Chard was an active researcher focused on studying instructional practices that are most effective at meeting the needs of students with learning disabilities. He has directed or co-directed grants and contracts totaling more than $15.5 million.

He is the author of numerous instructional programs on early literacy, language arts, and mathematics spanning K-12 education and has been a classroom teacher in California, Michigan, and in the U.S. Peace Corps in Lesotho in southern Africa.

A frequent presenter at national and international education conferences, Dr. Chard has taught courses on behavior management, special education reading and writing, learning disabilities, and special education law. He has served on more than 30 doctoral dissertation committees in special education, communication disorders and sciences, literacy and language, school psychology, and cognitive psychology.

In October of 2011, Dr. Chard was nominated by President Barack Obama to serve on the Board of Directors of the National Board for Education Sciences (NBES). He was confirmed in 2012 by the U.S. Senate and was elected chair of the board in 2013. President Obama has announced his intent to appoint Dr. Chard to his second term to the NBES.

Dr. Chard is the father of three adult children.

Doug Clements, PhD
Kennedy Endowed Chair and Professor
University of Denver

Doug Clements, Kennedy Endowed Chair and Professor at the University of Denver, is a researcher and curriculum developer who directs research funded by the National Science Foundation and the Institute of Education Sciences and has published over 130 refereed research studies, 23 books, 87 chapters, and 300 additional publications. He has served on the U.S. President's National Mathematics Advisory Panel, the *Common Core State Standards* committee of the National Governor's Association and the Council of Chief State School Officers, the National Research Council's Committee on Early Mathematics, the National Council of Teachers of Mathematics national curriculum and Principles and Standards committees, and is and co-author each of their reports. A prolific and widely cited scholar, he has earned external grant support totaling over $20 million, including major grants from the National Science Foundation, the National Institutes of Health, and the Institute of Education Sciences of the U.S. Department of Education.

Jere Confrey, PhD
Joseph D. Moore Distinguished University Professor
NC State University

Dr. Confrey is the Joseph D. Moore Distinguished University Professor. She teaches in the graduate program in mathematics education, and offers courses on learning sciences, curriculum development and evaluation, and related topics in mathematics education. Her current research interests focus on analyzing national policy, synthesizing research on rational number, designing diagnostic assessments in mathematics focused on student thinking, building innovative software linking animation and mathematics, and studying school improvement for under-served youth at the high school level in rural and urban settings. She holds multiple grants from the National Science Foundation and currently serves on the Research Council for NCTM.

Jan de Lange, PhD
Past-chairman/director of the Freudenthal Institute
Professor
University of Utrecht in the Netherlands

Prof. Dr. Jan de Lange is Professor Emeritus from Utrecht University, the Netherlands. Educated as a mathematician, his interest became more and more on how we learn mathematics and science. As part of his research he developed many educational materials from the 70's onward, in several countries and from grade K-12. Much of his work was carried out in the USA, in collaboration with the university of Wisconsin at Madison, ad with Learning in Motion in California. He served on the executive of the mathematical Education Board in Washington D.C., as Chair of the International Mathematics Expert Committee of PISA (OECD), was visiting professor in Wisconsin,

Honorary Director of the Shanghai Mathematics Education Institute and was awarded the ISDDE (international society for design and development in education) prize for lifelong achievement in math and science education.

Lynn Fuchs, PhD
Dunn Family Chair in Psychoeducational Assessment
Vanderbilt University

Lynn Fuchs is the Dunn Family Chair in Psychoeducational Assessment at Vanderbilt University. She has conducted programmatic research on assessment methods for enhancing instructional planning, on instructional methods for improving mathematics and reading outcomes for students with learning disabilities, and on the cognitive and linguistic student characteristics associated with mathematics development and responsiveness to intervention. Dr. Fuchs has published more than 350 empirical studies in peer-review journals. She sits on the editorial boards of 10 journals including the *Journal of Educational Psychology*, *Scientific Studies of Reading*, *Reading Research Quarterly, Elementary School Journal*, *Journal of Learning Disabilities*, and *Exceptional Children*. She has been identified by Thomas Reuters as one of the most frequently cited researchers in the social sciences, and has received a variety of awards to acknowledge her research accomplishments that have enhanced reading and math outcomes for children with and without disabilities. Her research projects are federally funded and provide doctoral students with opportunities to learn the methods for conducting high quality studies in the public schools to evaluate state-of-the-art intervention methods the research team develops. Her projects also provide master's students the chance to learn the skills necessary for understanding how school-based research operates and for appreciating how such research can have a major positive impact on the teachers and students who are involved and can improve education practice across the country and world. Training grant and research grant funds associated with these federal research projects provide doctoral and master's students with tuition support and stipends.

Russell Gersten, PhD
Executive Director
Instructional Research Group

Dr. Russell Gersten is the Executive Director of the Instructional Research Group in Los Alamitos, California, and Professor Emeritus in the College of Education at the University of Oregon. He served as a member of the National Mathematics Advisory Panel—a Presidential committee to develop research-based policy in mathematics for American schools. Dr. Gersten is the Director of the Math Strand for the Center on Instruction and the Director of Research for the Regional Educational Laboratory–South West. He has served as the Principal Investigator for several What Works Clearinghouse projects, chaired the Panel that developed a practice guide on Response to Intervention in mathematics, and is currently working on a practice guide to help teachers effectively teach problem solving in mathematics. Dr. Gersten has directed or co-directed more than 47 applied research grants and contracts addressing a wide array of issues in education and been a recipient of many federal and non-federal grants (more than $17 million).

Dr. Gersten was instrumental in the design and development of several observation measures of reading and mathematics instruction for several national large-scale impact evaluations. Observation measures he has designed have been shown to be reliable and well correlated with student achievement and teacher knowledge in several large-scale studies. Dr. Gersten has served on numerous Technical Working Groups for national valuations, and on several national and state commissions and panels focused on professional development, issues related to translating research into classroom practice, and reforming education for the U.S. Department of Education and national organizations such as the Council for Exceptional Children. He has written and presented extensively on math and reading instruction, special education, facilitating quality professional development, and study design and methodology. At present, he has more than 150 publications and serves on the editorial boards of many prestigious journals in the field. His empirical scholarship is heavily used by researchers, scholars, policymakers, and practitioners, and his research has been recognized with several awards and honors.