

**Strengthening Quality Mathematics and Science Learning for All:
Measuring What Matters**

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Conference wrap-up sessions

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Stephen: One of the things we discussed in the planning session for this conference was that often systemic initiatives—systemic though they are—are very local and they try to solve all the problems of the world very locally. But those problems aren't only your problems; they're problems across many of the other projects as well. And so it makes sense to band together to think about solutions to those problems. Someone else may be working on something very similar or using materials that are very similar. The planning group really wanted participants to be able to look for links to other projects that are facing some of the very same issues and to identify ways to collaborate across the region to solve some of those problems. In particular, they wanted us to think about the research agendas that you're undertaking because those often are paid the least attention to when you're so busy trying to work with schools and teachers. Research agendas are difficult to continue

promoting when you're already overloaded and working Saturday mornings already.

I also want to say that this process was meant to be a hard-working, reflective process. It's an inquiry. So we wanted to spend some significant time this morning trying to make meaning out of what you've done the last two days and how you are going to move forward with what you have learned and discussed here. This closure is incredibly important. Some folks said oh, it's just reporting out, I can leave. And that's what we've come to expect from conferences—that reporting out is sort of a task that doesn't have much meaning. And I want to go back and think about that a little bit.

Reporting out is probably—in this case, if networking is the objective—reporting out is probably one of the most important things you can do. And so I appreciate everyone who's here in the room this morning.

We have invited several people who have national connections, who have been here the past two days presenting, participating and observing, to present their views of what has been discussed. They maybe have a very different perspective than those of us working locally. They are Ohkee Lee, Joan Ferrini Mundy, and Norm Webb. First, we will hear from Ohkee Lee.

Ohkee: It really was a pleasure to attend the meeting . I thought I knew something, but I realized that I really do not know a whole lot. I was trying to figure things out, what it all means. The whole conference was really about measuring what matters for all. So there's something about measuring. What matters in terms of substance? And then, the term "for all," meaning, who are the people that we are talking about? So given that, I'm saying that we're measuring, but what are we measuring and for whom?

So the first thing that I'm thinking about is that there are students and teachers and professional development and the evaluators and all the others. In terms of students, we are talking about outcomes. So in terms of outcomes, we are talking about subject matter, what matters. One example is algebra that Joan Ferrini Mundy talked about yesterday. Julio apparently asked Joan to talk about the algebra issue and as Joan said it's not just one issue, it's a whole slew of issues. So she unpacked some of the complications of one subject matter area. And if you think about all the other subject matter areas, it really can become quite complicated. On top of that, we have issues of diversity and identity in terms of language and culture. And we always measure certain things, but we don't think about diversity and identity. The fact that issues such as diversity and identity are intangible does not mean that they are not important. I was very delighted to hear a lot of people here talking about diversity and language and cultural identity as important issues.

So what is measurable and what is not measurable and what do we mean by that? Again measuring may be something that is concrete but it may be something we try to do even when something may not be tangible enough to measure. It's also an issue to think about. So if we do the right thing, then the outcomes may start with students who are completing high school and go on to college, and the students who are doing well on standardized testing and then what we consider meaningful learning according to standards documents. And this is not a small matter. When Susana Navarro talked about the high percentage of Latino students who drop out of high school, it's a very significant issue. Norm Webb will say that the really important thing is

to align these three so that the students complete all of these and then more. Now given the set of outcomes, what would be expected of teachers and teaching? And I just put down alignment as a key. That does not mean that alignment applies only to the teachers; it applies throughout the system. But at least in terms of actually in the classroom, the alignment of curriculum, the alignment of instruction, and assessment seem to be key. And, again, that alignment should take into consideration the subject matter and diversity, so that what is being taught gets measured and then that's what the students accomplish.

Now to make these two happen—and they're really key—we need professional development. But this can be complex, and we talked quite a bit about it. Let me just go onto the next level and how it relates to professional development.

It appears that many of you here are implementing policy into the classroom setting—you are the policy makers, instructional leaders, and instructional implementers, and some of you are part of higher education.

Translating policy into the classroom is a pretty tricky job, and I admire what you're doing and the complexities involved. As Joan talked about, people are going to ask you about every single thing that you do—why is it important? Why are we doing this? So you need to defend that the reason why it's important—so you think about the conceptual issues of what we are really doing and why it is important. Then you actually do it, figuring out how to carry it out with the resources available and which strategies will be used—all practical things. So you are going through the process of answering why are we doing it and how are we going to do it.

Some of you may be trying to change the political context to make it work easier. Some of you may be at the stage of thinking more about doing it, while others may be really working harder on this part. But all of you as a collective body seem to be the people who are actually doing it conceptually, practically, and politically.

We also have another group—the evaluators—who try to see how what everything that’s being done throughout the process impacts the student outcome so that the assessment of students, the evaluation of the whole system, actually works in alignment.

Throughout the conference I have heard a lot of themes that seem to be common. The first one seems to be voice. Whose voice are we talking about? One group mentioned particularly the importance of student voice that often gets ignored. Extending it, voice really means that we also need to be the advocates for those who do not have strong voices and tend to get ignored. So the advocacy for those who don’t speak out, and that’s why we are here too. Then there is buy-in and then systemic, data-driven, multiple views, using alternative methods, in a collective way, collaborative, shared, and supportive. They are all aligned but for the purpose of being able to use disaggregated data in a critical way in a fair and just system. All of those apply throughout the whole process. In a sense, you have the whole process and you have the notion of how this whole process works, using all these ideas that apply to each single step.

Now Stephen mentioned that we [Norm, Joan and Ohkee] are from another galaxy, so let me go back to another galaxy. See, I’m trying to do the alignment. I have watched most of the “Star Trek” programs and I know

Romulins, Klingons and Cadessians. Those are all species from alien planets. One expression that I always find very mysterious in somehow working is one used Captain John Luc Picard. When they were in a battle, he would ask the engineering team how long would it take to fix the system. And the team would say "It'll take about six hours." Then the captain would say "We have only two hours, make it so." And I don't know what happens, but somehow miraculously it always works. So the key is, given all of this, make it so. And make it work

Norm Webb

Norm: It's honor to speak to you. I value the hard work of all the people that I've seen around here, particularly in that alignment strand. We went through an exercise that nobody's ever gone through before, and maybe nobody will go through again. But everybody stuck with us for over a long period of time and I really appreciate that. I agree with Joan's assessment from yesterday about the growth and sophistication of those involved in this business. I could not have done what we did in that exercise five years ago. People did not have the understanding of systems five years ago that they do now. And so that allows us to do things at a different level than what we could before, and I think that really shows progress, that shows a development of understanding that we have about this.

This notion of systemic reform, everybody says it—it takes time. Unfortunately, the politicians, the policymakers—even those at NS—do not have an adequate number of horizons—you know, the five-year chunks. It really should be 10- and 15-year chunks in terms of what we're trying to

accomplish. In the alignment strand, one of my goals was to take some ideas that we've heard about and add more meaning to those ideas. I could not possibly add more meaning because what I tried to do—and what was accomplished somewhat—was to bring everybody's expertise involved in that. All of you come from different experiences, different contexts, so that was very, very important. As a result, I am looking at alignment a little differently, having come through here—I've learned a number of things because I started to see it through other people's eyes.

One of the things is this notion of context. I think that context is important. How do you structure an experience for people that allows them to bring in what they understand and then apply that and mold it within their own situation and own context? I think that what we did this somewhat with this alignment strand—we at least got participants working in that direction. But I know that people are going to have to go back and think about it. Once I did an alignment institute that was about three days long. And three months later, I was talking to one of the people that attended that institute. She was a math supervisor from a district. One of the things that we talked about was the difference of just looking at content and also looking at cognitive development and looking at that depth and knowledge level. And what she said is that—you never know exactly what's going to happen—she went back to her district and started to work with teachers in the classroom. Their district's scores were very low compared to the state assessment scores, and she said they didn't know why because they were doing the curriculum the way it should be, and they were doing everything right. But when they started to analyze their curriculum and they started to analyze the kind of

problems that they were having and their students' work, they found that the cognitive level, the depth and knowledge level, was lower than what was being tested on the state assessment. And so even though they were doing everything right, they thought they were doing all right, it didn't match up. It wasn't aligned. That was a very interesting story for me to hear--that a simple idea allowed them to start to analyze their instruction and start to analyze what they were trying to do within their classrooms. And that gave them something to think about.

There's two ways of thinking about this alignment as we discussed. One is thinking about it as an evaluation tool. That is, where you look at a system and you see how the system is aligned, how the pieces are working together. But another way is of looking at it more as a construction tool; that is, how do we develop a system with all the parts working together? I think that some of the criteria that we discussed can work in both ways. Another important concept that we've tried to talk about was this unit of comparison, that to make things measurable, you have to be able to define what it is that you can compare. And one of the things that we talked about, too, was the articulation across grades. Another important idea that one of the participants in the alignment strand brought up was this notion of looking at growth over time. We have a tendency to look at attainment, where students are at a particular time but not in their growth over time. And that, I thought, was a very important insight.

About three weeks ago, I was at a conference where Bill Sanders spoke. He is a statistician from Tennessee who is now working for SAS and he has done a lot of work with value-added. One of the things that he discussed was

that if you have students who achieve a normal year's growth each year, then you can eventually get very, very far in the system. But if you have one year out of the 12 years that students are in school that is a below-normal year, that has dramatic effects upon their ultimate outcome. Just one year. And if you build on that, if you have two years where they're not reaching a normal year's growth, that really accents their low performance later on. And this gets at alignment—looking at normal years' growth over time. That issue of alignment is why do students not have a normal year's growth over time. It could be instruction, it could be curriculum, it could be professional development, there could be many reasons. But that, I think, was a very, very powerful message. So I thought that everybody is to be congratulated in terms of the amount of work. I think there are many challenges before you as everybody knows. And from my perspective with regards to the alignment issue, the big challenge is really to make this your own and take the ideas and take the theory and put it into practice. So thank you very much for your hard. Thank you.

Joan Ferrini Mundy

Joan: I want to say when I was asked to make these remarks, I had thought that I would have been here for more of the meeting and been more alert through the parts that I was observing. So here I am supposed to talk about and do some synthesis relative to the professional learning community section, and I wasn't even sure what the definition of professional learning communities for this group was going to be until I got here yesterday. But, fortunately, there was a handout that showed what the components of a

professional learning community were supposed to be. And so I was able to use that in trying to observe what I saw yesterday. So I apologize for not being here through the entire meeting and being able to really draw on what got said on Thursday and the parts of yesterday where I was still jetlagged. In any case, though, what I took from the handout and from the conversation that I heard yesterday, in terms of a definition of the elements of a professional learning community were these pieces. And the handout is something that's really aimed at a school professional staff as a professional, as a learning community, so these are renditions that are meant to be just a little bit more general but which seem to work in a few different ways.

I wanted to only take a few minutes to comment about them from the perspective of what I'm hearing about your individual work and your own projects and your own regions and your own domains, but to come back to the collective, to this group of professionals in the room who are working in this domain of systemic change and have been for some years. And I would like to reiterate my remark of yesterday, that this is an incredibly sophisticated conversation compared to what it was six or eight or 10 years ago. And so there's this notion of shared power, authority, decision making, that is meant to apply, certainly in the school-based team or in a district-based team. The notion of a shared vision and focus on learning, that is all aimed at—of course, in the case of the very-close-to-practice versio—aimed at student outcomes. The idea that there should be collective learning and application of that learning going on continually. The idea that there's a mechanism for review and feedback, and that there's an infrastructure that supports work, that makes it possible to work in systemic ways. And so all of

those pieces are part of the definition of a professional learning community. And I think that there are many levels of these professional learning communities. So there is the professional learning community within a school, which is certainly the way that that definition that I worked from, the handout, is sort of cast. And that seems to me to be something that this group, in my three hours of listening, has thought deeply about. That that's a part of the way in which your work actually proceeds and that you're able to make progress and make changes through the building of those communities within schools, maybe within a district, so that it's at a slightly bigger grain size, but you have worked at that and made it possible for those elements of a professional learning community to be in place. There's also the notion of a professional learning community within the leadership of your own systemic initiative. So that goes beyond, perhaps beyond a district, beyond a building.

We talked some yesterday about the way in which higher education is involved in that, and I just wanted to make a very quick comment to that point based on my own experience now in a university where I'm relatively new. It seems to me that the couple of leverage points, at least in mathematics, for the involvement of higher education, has to do with problems that people in the university really see as true problems for them. Trying to bring them into understanding the K-12 problems can be a second step. But they need to be working on something that they see a need to solve. And the two areas that I'm observing in my own university—the mathematics department is terribly worried about the placement test scores of their incoming students because it has a big financial implication for them. They need to staff and cover enormous numbers of sections of introductory

algebra courses. And so that strikes me as one point of leverage, to really work on the articulation between high school and college and how they're doing on those placement tests, which could then lead you into making more sensible placement tests. Because I don't think that those tests typically reflect the high school trends in curriculum. And the other leverage point has to do with teacher education. The universities, of course, are very eager to find placements for their prospective interns and student teachers that will be hospitable and that will model the kinds of curricular and instructional innovations that the faculty would like to value. And so to be a source for that, I think, is just one other area where higher ed could be involved. But it really isn't any of that that I really wanted to talk about in my two minutes. It's about you as a group. Thinking of yourselves as a professional learning community, the group of people in this room and your colleagues across the country. If you are a professional learning community, which it certainly appears in a short observation that you are, then of these components of a professional learning community, where is the best spot or which of these might be the best bets for continued work or pressing for continued work. Because it feels to me that the ones I haven't noticed—shared power, authority, decision making, that's in place. The review and feedback processes—you have evaluators all over the place. That's definitely in place. The infrastructure that the NSF and other entities provide for the work is in place perhaps. But I would leave with the recommendation that as a community, it's these two areas that can continually benefit perhaps most from more work. That is the finding of a shared vision. It seems so pressing to do as Ohkee said, the very practical work that you all need to do, the

implementation work. I also wanted to remind the group of the continuing need to go back and look at what it is we're trying to implement, what standards we're aiming for, what learning goals we hold, what level of complexity in student learning and thinking we're really after, and to make sure that we keep the focus on that part of the conversation, all the while working at the implementation, the alignment, the political side. And then, secondly, the fact that we need to be continually learning as a group and coming to learnings that are important and valuable and that can be applied. A lot of that, I think, is happening around, again, the questions of alignment, questions of evaluation, enormous progress on the questions of gathering data and finding out which kinds of measurements are needed to document which kinds of processes. But let's go back to something even more fundamental—there's still a lot to learn about mathematics, about science, about the teaching and learning of mathematics and science, and those elements, I think, can be part of the conversation too. So with all that, I would like to also add my congratulations to your efforts. Your work is important and crucial to the continuing improvement of science and math education across the country. I think the examples that I'm hearing glimmers of across the room and in the systemic program are examples that we need to be able to publicize, learn from, transfer into other kinds of settings, and I wish you all well in this work.

Stephen: I really appreciate the comments from all three of you. What I asked them to do was to help us get some perspective on what we've done and where we're going and I think I certainly got a better perspective on what we did here from listening to the comments. So I really appreciate it. Again,

the three strands weave together in funny ways. And we kept thinking of a three-legged stool when we started talking in the planning group. The three legs work together and without any of them, you'd fall over. So don't think of these elements as isolated. And so one of the tasks now is how you're going to do that as a team.

GROUP BREAKS INTO TEAMS TO PREPARE PROJECT COMMITMENTS; THEN EVERYONE RECONVENES FOR ONE LAST TIME

Stephen: All right, I'd like to reconvene us here. I wanted to share with you a little bit about the things you wrote for your project commitments. And last but not least, after I do this, we have a couple of people that we asked in the strands to be internal participant reflectors. We're going to ask them to, if they wish, stand up and make just a few brief remarks about their perspectives on the meeting as the final say. If you were—you were all reflecting as you went through this, so even if you weren't one of those people and you want to say something, you know, there's a mike here and you can say it. We welcome all comments. But we did actually seed this with a few people that we asked if they would be comfortable doing it so that they had some time to prepare some thinking about their experience.

First, I'd like to just really quickly go through. I summarized the sheets. I didn't get everything down that you guys wrote. But I want to share with you some of the ideas that you wrote. Let's go back to the agenda. I'll just read you the question you were going to answer in the strands—how do we know what to teach when and how will it be assessed across the

educational system of systemic alignment question that we wanted to investigate. And here are some of the commitments teams made that we just copied down from the forms.

- “Definitely take these ideas back to the larger team. “ I think those in the systemic alignment strand know there’s a lot more work to do with this, and they need to do it with a much larger team. They’re working with a lot of expertise but certainly they’re not facile in the tools yet.
- “Share the depth of knowledge analysis and use it to analyze assessment tools.” I think this is a great outcome, great place to go.
- “We saw right away, I think, in the strand, how valuable that would be as a different way of thinking about is this a good assessment, does this match up to what we want our students to be doing.”
- “Align classroom instrumentation to professional development.” Imagine! We now have some ways of thinking about this problem.
- “Align classroom activities to district standards.”
- “Strengthen the K-16 connection.” Quite a few comments like that.
- And I like this one, I wanted to quote it in entirety: “Clarify the complex definitions of systemic alignment and all of its components.” I want to go with that team. That’s a challenge, but one team feels like they have, they can take that on as the next step.

The second strand was the professional learning communities strand. And the question was, how do we build ongoing support structures for teachers to enable

them to perform their tasks in the highest quality way. And here are some of the commitments people made, building on what they learned.

- They're going to go build baseline data on how their teachers are doing that kind of thing, on how their professional learning communities are being supported.
- They're going to review and revise teaching models based on some of the baseline data.
- They're going to enlarge the role of professional learning communities in their project. I think if people feel able to do that, that's a terrific outcome.
- And, again, work to include K-16 in a professional learning community. I think that was one of the high purposes when we heard from the planning team, was that this has to be K-16, we have to start thinking that way in everything we do.

Finally, the tracking student performance strand. The question was how do we know what students know and don't know, and how has teaching impacted their knowledge? So here's what people are willing to go do, have committed to. And I like this first one.

- "Listen to students' voices." And we need some tools for that, don't we? How many of you knew which teachers in middle school were good and which ones weren't?
- "Shift from systems data to growth data." I think this is a synthesis piece that comes from several different strand conversations, but I like where it is, under tracking student performance.

- “Track professional development and its implementation in the classroom.” Something we say we do, but we all know that it’s very difficult to make connections there.
- “Align sources of data.” Again, I think some teams are synthesizing across the strands.
- And, finally, “Help teachers build assessments that will align with state and district curriculums.” If we do all that from this room, we’ll have gone a long way. And that’s not any one of us, that’s all of us together.

So I think that’s a terrific set of expectations. I would hope that next year when NSF does its, that we take some of these ideas and kind of put them into well, how far have we gone, what do we have, what have we created, what tools have we made, and what can we use them for. I think that would be a great growth. Instead of measuring where we are, it’s measuring how much we’ve grown. So we come to the final moment here and I want to turn the mike over. We asked a couple of people to spend some time thinking, writing, listening carefully, reflecting in their, and sharing that with us. We want to put that up on the Web site so their notes will be up there as well, so we’ll make sure that they want to approve what we put up. But I want to ask them to come forward if they’re willing to, and talk to us a little bit about some of the things they thought about as they went through the last two and a half days with us.

Dennie L. Smith

Dennie: One of the things that I gathered here is that there’s just a tremendous amount of, a lot of good ideas. It’s, this group, all the brain cells and all the conversations I’ve had informally, it’s just a tremendous number of great

ideas. The challenge is advancing and implementing those ideas. And we're probably a unique group. We're probably singing to the choir as we say, but we need to keep in mind is that what really counts is when we get these ideas in classrooms. And that ties into the real support that teachers need in implementing new ideas and going through change. And it's been said, but one of the things that hasn't been talked about a lot is the psychological support that teachers need when they are changing. Remember, they're a very lonely group, isolated in classrooms. Working many times in very difficult situations, especially in urban environments, in very challenging situations. Okay, that's a comment. The other comment is something that if you've studied Stephen Covey, you'll know—"Start with the end in mind." That came out in our work with Norm and his work with getting us to think through the alignment process. We need to focus on our standards and back up to see what we really need to do. It's more like a good business model too. Out of that, I think, since there is a lot of top-down change, is how do you gain ownership. And I've been trying to deal with that and I think you gain ownership through collaboration, K-16. That's really critical for us to make meaningful and deep change. And I wrote this statement down about collaboration. It generates collective power and confidence. I think we all need confidence that we're working towards something that's meaningful and will make a difference because we're easily bashed by politicians and the public. So we need to work together and collect our energy and work in a unified force. And the last comment is about higher ed. And there was a little bit of bashing of higher ed. And what I would like to challenge all of us to do—and in the Memphis group and I think we have a different kind of

relationship—is come to higher ed with what you really think you need. Higher ed is very complex and very highly specialized. So come with something you need and I think you'll find people willing to work with you. Not all of higher ed, thank goodness, but there are people that are willing to work with you and I think if you just create that menu and say here's what we need. And then we can move together. I like the K-16 ideas and I think that especially in the Memphis group, we're going to pursue that and use some of the tools we've learned here to get colleges of education, arts and science people, involved in this whole business of learning

Paul Swets

Paul: I'm Paul Swets and I'm also a higher ed partner for the Texas Rural Systemic Initiative. I mostly agreed to do this because I got this nice pad if I agreed to talk. They gave me this, so I had an ulterior motive. I was in the professional learning communities strand. I was awfully impressed with both the work that had been done in that area to sort of organize and parse out the different things that make up a professional learning community, and with all the expertise that was in the room. I have three or four things to say, and that's probably two more than you want to hear, but I'll stick with that.

The most important thing—the most impressive thing—from this group was the variety of expertise. And, especially coming from a higher ed background, it's very valuable and also not very common for me to be in a room with all of these kinds of people—assessment specialists school district staff, school teachers, some administrators—all of those kinds educators together with their own viewpoints. And I think that's a powerful contributor

to some of the things that we can do here. So that's one—kudos to SEDL and the NSF for putting this group together.

The second thing that sort of struck me about what we're working on is that most of us have this goal—student performance and standards-based student performance—and I guess the fact that we're here means we agree to some extent on that. And we also know where we are now, which for a lot of us is not far away from where we want to be. But one thing that was very valuable about this meeting was that we spent a lot of work on the intermediate steps. We didn't try to take that big jump from here we are and now we're going to end up where we want to be, but we spent time setting in place some of the intermediate steps and some of the mechanisms, some of the infrastructure for getting from where we are to where we need to be. And we talked about what sorts of shared leadership and things we need to have. We talked about assessment instruments that we can get to measure where we are and whether we're progressing in some innovative ways—I can't remember this thing—Innovation Configuration that we talked about, which I thought was extremely interesting and that's one of the things that our project is going to intend to use. But all of these methods, this methodology, this infrastructure, this set-up to help us get from where we are to where we want to be, and I think that's also a very valuable thing that can come out of this kind of expertise and all of these various stakeholders.

I can also echo the psychological emphasis, that whether we're in higher ed or whether we're working with some sort of systemic initiative, whether we're a principal trying to get our test scores up, or whether we're a school teacher trying to get our students to pass—whatever we are—there's a

lot of benefit to be had from confidence that we're not the only one doing this. We're not the only one working on this. And, in fact, there's lots of people lots smarter than me working on it and who can do a better job than me and I can sort of ride along with them. And I think meetings like this help focus that. Help give us the confidence, help show us that this is not me and one of my colleagues working hard in our office in San Angelo, but rather there's a group from all over the southwest, lots of really competent and capable and smart people working hard with the same goals in mind. And so that sort of confidence thing, also struck me as important.

The last thing—and then I'll stop. You know, you can't give a professor a microphone; that's always a mistake, you should know better. But the last thing, we talked about K-16 a lot and some of us talked about K-20 a little bit. My impression really is that we need to be broader than that and this room reflects that. That there are lots of us in this room who are not in the K-20 strand, who are outside. We need to have education service centers involved and we need to have these systemic initiatives who are sort of outside some of the educational structures involved. And we need to have lots of other stakeholders besides the academic community. We need our business partners and our community leaders involved in this movement too. So when we're talking about broadening from K-12 to K-16, I think let's not be shortsighted. And let's say, I don't like the phrase but "think outside the box," if you like. Think outside the academic box and make sure we're including and involving partners from, not just K-12 or K-16 or K-20, but all of the stakeholders and all of the people who are involved in this process, or need to be involved for it to be a success.

Dee Chambliss

Dee: Okay, I just wanted to bring you a summary from our session, our strand, which was systemic alignment. And I was really fortunate, I thought, to be in that strand because it really helped us to pull things together. Norm Webb was wonderful in facilitating us and leading us through exercises. The definition he gave for systemic alignment was that it was a powerful tool for focusing instruction and focusing on curriculum and assessment and all of the many, many factors you have to consider when you're really talking about bringing it all together. Also he helped us develop an appreciation for the complexity of this whole process. It is not a linear kind of process where you align curriculum and you align assessment and you're done with that, and then you align instruction and you're done with those three pieces. But in the process, you must keep going back and forth—just the sheer complexity of it makes the task almost overwhelming. But you must have a framework and that's what he provided for us, a framework to look at the process, to look at what your whole purpose is with your system, what your policies are and the things that govern what you do. And then you must look at the programs and look at the practice and focus on the student outcome, what is it that you really want. Looking at those four major components and asking How is it that aligned with higher education requirements? How is that aligned with what our teachers are doing in the classroom or with what our standards are or with our teacher education program?. You need a real framework for looking at all of those very, very complex issues.

One of the things that I thought about as a way to wrap this up was that when we shared in our teams, it seemed that we were all talking about

the same thing because we all had that K-16 mindset. We talked about data and we talked about data and systemic alignment, and we talked about data and professional learning communities, so it just all fit together and for our team to have the time to share and to just kind of pull the pieces together was very, very valuable. And that's the kind of thing that we need more of, time to find out, to develop, to share tools. To think, to look at things in a new way, then opportunities to reflect on it and then to put it into practice or at least develop a framework for going back and putting it into practice. So, I applaud this, the strands and the opportunity to share within teams, and I also would like to see us to have more opportunities for us to do that in our effort to make this K-16 system more seamless.

Stephen: Thank you. I have to say that's a brave thing for people to do, to stand up at the end of a conference and speak because they have to stay until the end. The bitter end. But here's Julio and we'd like to get some remarks from him and then I have just a final comment. And we'll let you guys go and I hope, I think we're going to be early, yeah.

Julio López-Ferrao

Julio: I have two versions, the long version and the brief version. And Vanessa, who I work with, was kicking me saying brief, brief, please. So just to please her, I'll be very brief. Just to reflect a little bit on why is it that we're here. And the reason I raise this question again is because I wanted to fully understand why is it that we are here. It happens that NSF has always had these huge meetings in Washington with all the programs together and huge teams coming and not being brave enough to stay till the very end of the meeting. You're here, you're to be commended. We were wondering if we were being

really effective in ensuring that technical assistance, that sites needed through this kind of meeting. So we decided to move on to a more focused strategy and approach and I was convincing enough to have Costello Brown say well, let's try a different approach. For two reasons: The first reason was that when we tried to split the nation in regions, that was a kind of different venture. It happened that I have almost all of the sites with Texas. I'm not a program officer for the Texas SSI or in any of the rurals, but the rest are sites that I work with. So I volunteered. And the next question was can we do this for ourselves? So let's partner. And the natural partner that came to our mind was one of the educational labs. So we contacted SEDL immediately because of the regional distribution. We ended up conceiving this meeting, thanks to the advisement of the planning committee. And even when it was translated into a proposal and reviewed by a very excellent group of reviewers, I remember that we had six reviewers—five of them rated the proposals submitted by SEDL excellent, and one very good. So it was a very highly, high quality proposal. It looked very nice and we began the process of planning that was mostly between Stephen Marble and myself. I know that we both have learned a lot. I have learned a lot.

If you ask me now was this worth doing, I would say definitely. I have more than good evidence to say I have experienced genuine conversations related to key issues on math and science education that should serve as a basis to move on in the right direction, which I have not heard before at that level. So my personal evaluation is of course, we successfully accomplished the goal. But I need to add a footnote to that and go back to the message that was on the screen this morning because I'm part of that key message. I need

to confess that I was skeptically enthusiastic because I've been in too many meetings with a lot of talk, a lot of sharing, and people—even those who work with me closely, meaning my sites—and then for some reason as we go back and as we move to our sites, the ideas fly away. And then we go back to dealing with the same issues and the same questions. My hope is that as a result of this meeting, we continue these conversations. We're still missing the structure that will help us continue interacting the way we have in this meeting. That's a missing piece. I'm not fully clear what is it that we will do to network effectively throughout the coming next two or three years. We need to explore that. But regardless of that, my message to NSF and to the division is I feel fully satisfied.

I promised Vanessa that I was going to be very brief. I'm tempted to go on and on, but I will not. My message—just to use one of Ohkee Lee's key messages, congruence—to be fully congruent with the tree that's behind me. I wish you happy holidays, Merry Christmas, and a Happy New Year! And I hope we see each other again. Thank you.

Roni Rentfro, planning committee member & project director, Brownsville

Roni: I hope I'm not overstepping my bounds in speaking for the planning committee they've pulled together. And thank you, Julio, for putting me on the planning committee, getting to work with you and Steve and all the other wonderful people. And I'd like the planning committee to stand up again, if you would, that are still here. Because I have to say from my perspective, you all did an incredible job of taking all of that discussion that took place in that day and a half and turned it into a reality that we feel very confident. And Julio had that concern about what are we going to do when we go back? And

Vanessa and I looked at each other—we're going to pick up the phone a lot more because we feel a lot more comfortable now knowing that we have a common base to speak from, we have a personal knowledge. We got to have those hallway conversations, too, to where we feel comfortable talking to each other, really down to the actual nitty-gritty how-to and sharing those ideas. And now they know that oh, yeah, they had a good idea, we're going to really contact them where before—I'll be honest—we met at conferences and it was like oh, yeah, they're showing just their good stuff. Now we feel like we know the real progress that we can make and how long it may take and how long that struggle is because like when the group was talking about—from El Paso—two years. Now it's like okay, so when we're trying to do something in a year, don't feel bad if it's going to take a little longer. And if we're trying to do something in one week—we heard others say, no, six weeks for this. So that I have to say personally, I have to say was a big thing and I think probably I can say that for the rest of the planning committee. Thank you all very much.

Stephen: I just want to say one final thing about what I heard, and that was a lot of talk about data and data tools. And we can't do this without good data tools. You know, we have feelings, we have beliefs, we have emotions, but we need information. And one of the most important things we heard from the planning group was "Let's talk about what tools there are and what tools there aren't because there's a lot of tools we need that we don't have. And if there's a way to work together, think about that. How can we build tools that we can share more and more?" I would hope that the follow-up to this is the continued engagement between you and your NSF program officer and also

the regional technical assistance providers like SEDL's SouthCentral Regional Technology Assistance Center and Southwest Consortium for the Improvement of Mathematics and Science Teaching (SCIMAST) that I represent and the service centers and the state agencies to build those communities that are broader, like Paul was talking about. So data is the thing I heard that is very different from earlier conversations about intention. We started talking about tools to measure. And I think that was the goal, measuring what matters. One last word and I want to go back to Ohkee Lee this morning because she started off so nicely this morning and I want to use Picard's other favorite phrase—it's not just "Make it so." It was "Engage!" You guys have a good trip home and happy holidays..