

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

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Luncheon Panel Discussion**

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Panelists: R. D. Anderson  
Janie Schielack  
Kamil Jbeily  
William McCarthy**

*[Note:; "A" indicates member of audience]*

Brown: Broadening regional collaborations. And the reason that we wanted to put the panel together was that the one thing that the total panel has in common is that they are all supported by the National Science Foundation. And one of the things that we don't do very well often is communicate amongst each other. For example, I will just make a very quick example. How many of you right now are sitting at a table where there's nobody else there from your district or your project or your program? Not too many. And so the whole purpose of this meeting, the whole purpose of the meeting was really to get people to collaborate in this region, to start to work together to find out what's going on in the region and what was working, things that we could share together. And so what we have here now today are people that all have, as I said, NSF support. What I'm going to do initially and the way that we will start this off is that I'm going to ask each one of them to give about a five- to seven-minute presentation, just explaining—first introduce themselves, explaining what they are doing with their project, the nature of the project that they are working on

as funded by NSF. NSF may be only partially supporting what they're doing. The whole effort that they're carrying out. And perhaps indicate some of the ways that they are collaborating with some of you already. Those of you who are in this region may actually see ways in which you may then be able to collaborate with them. So the goal will have been achieved if you do see or hear things or ways in which you could collaborate. At NSF we don't collaborate very well either. Some other divisions we don't always know and we don't always talk to each other. But we always require more of people than we require of ourselves. And we're in this region; we expect a lot more of the southwestern region than any other part of the country. So this is a model for the nation. Is that right?

All: Right.

Brown: Thank you, thank you, thank you. So let's get started. Amen! Let's get started. I have sitting right next to me. Dr. R. D. Anderson, who is—and he's on this second page—who's from LaSIP in Louisiana State University. Sitting next to him is Dr. Janie Schielack, who's the Director of the Center for Teaching and Learning at Texas A&M University. Next to her is Dr. Kamil Jbeily, who is Director of Texas Regional Collaborative at The University of Texas at Austin. And on the end is Dr. William McCarthy, who is the principal investigator for the Regional Alliance for Science, Engineering and Math for Students with Disabilities at New Mexico State University. And we'll start with Dr. Anderson.

Anderson: I'm the senior advisor for LaSIP. LaSIP was one of the first 10 funded of the SSIs back in 1991. And we had matching funds from the state—a million dollars from the Board of Regents at the higher ed level and a million dollars a

year from BECE—the Board of Elementary and Secondary Education. So we automatically had a kind of collaboration between higher ed and at least the state school system, if not individual school systems. We also had higher ed Eisenhower money, which came to about a million dollars a year that we were responsible for handling—not initially. It wasn't initially, but which we shortly afterward got involved with handling. So we had a lot of collaborative efforts with other aspects of the state, and our job was to produce professional development for teachers at various levels. We started out because we had some background with emphasizing grades 5-8 or 6-8 or maybe 3-8 in some cases. We put out RFPs and had these judged by out-of-state reviewers. Had the proposals judged, I should say, that responded to the RFPs by out-of-state reviewers. And we would award, oh maybe 25, something like that, projects per year at various universities. They had to be funded through universities because funding through the Board of Regents required funding through universities, as did the Eisenhower money. But we had lots of collaboration. But one thing we got quickly out of this was a lot of university subject matter faculty who got involved from the very beginning in math and science professional development for K-12 teachers. And this gave us a big head start in getting a widespread, statewide kind of effort. By the way, I should also mention that one of the nice and impressive things was SEDL's role. SEDL kept holding meetings in which we were sort of automatically invited and has—I think SEDL has for the last 10 years and we've had a chance to talk with lots of people from other projects around the region. And I want to thank SEDL for that; that's been very valuable. In 1993 we got the Louisiana Collaborative for Excellence in the Preparation of Teachers as part of the NSF program, and we

had the same leadership for the two programs. So somewhat like the El Paso report that we heard earlier, we had a close collaboration between professional development at the K-12 level and teacher preparation at the college level. And we now have the, a major initiative in Louisiana, K-6—pre-K to 16-plus initiative that is, and we have the coordinator for that is Stephanie Williamson, who was with our project up till about a year ago from the very beginning. And this is involved closely with collaboration between universities, colleges, and K-12 education. One of the outgrowths was a Project LIFE at Louisiana Tech that Linda Ramsey headed. Project LIFE started as a project under LaSIP. It later had impact on their teacher preparation program at substantially—she was a biologist and she later got NSF funding for that over several years. And then I think USDE—U.S. Department of Education funding or congressional type funding. Anyway, she's now in the congressional budget on an ongoing basis and works with Texas, Arkansas, and north—chiefly northwest Louisiana, and in an organized and cohesive way to get many more people to think of the issues related to Project LIFE. Among other outgrowths of our early efforts were the AMP program—or LAMP as we call it, because it's Louisiana Alliance, I think, for Minority Participation. And we've had continuing, ongoing participation in that. Anyway, I think that's probably my five minutes.

Brown: We're going to go next to Professor Schielack, who's the Director of the Center for Teaching and Learning at Texas A&M University. Texas A&M was one of the two first centers that were funded in the country and also the, there is some language in the new partnership program that I was talking about where people are being encouraged to work with some of the centers already in terms

of putting together proposals. So please listen very carefully to what she has to say; it may help you with some of your proposals.

Schielack: Well, the goal is to help us both, right? So I am Janie Schielack. I am the Director of the Information Technology and Science Center for Teaching and Learning. I have to explain a little bit about our name. Names are supposed to be explanatory, but they're not always. Our focus is on the use of information technology in the form of modeling, visualization, and interaction with complex data bases. We kind of assume the existence of e-mail and communicating and instructional technology, so what we're really trying to focus on is the use of the kind of information technology that scientists and mathematicians use to do their research and how we can reap the benefits of that in K-12—7-12, actually, education also. It also says we're information technology and science, but we have a math-physics team, so we bring the math people in who are interested and put them in applied situations with physics, so it really is a science and math program as well. A little bit of explanation. The program you'll see, if there's some mention of it in the RFPs that come out, we'll let—we'll call them the centers for learning and teaching. That's what the program is called now, but when the first two were funded, it was the center for teaching and learning. So we really are the same, all the same thing. So with that explanation, I'll tell you a little bit about what we do. We have basically three goals and they're common goals across all of the centers. I had the opportunity to be in a PI meeting with the other centers just last week. So it was nice to find out that we had some commonalities because otherwise we're very, very disparate and very different. But the common goals for us and the others are first to produce education specialists in the area that

we are focusing on, which is the use of information technology to teach and learn and do math and science. By education specialists, we're talking about the people who are going to replace us. Some of us in our group this morning heard someone talking about needing replacements. NSF is feeling that way. Universities are feeling that way. We have a generation of people who were trained through NSF programs before that are beginning to get to the point of leaving their careers and moving on to something else in the rest of their lives. So we really are looking at developing leadership, not just at the public school classroom level but at the decision-making levels, university levels, and I've just come out and laid it on the table—we really are talking about taking people out of the classroom and moving them into leadership positions. not all of them, but some of them really need, that needs to happen. And so part of what I think one of our connections is for groups like you to help us identify who those people are. And encourage them to become the leaders of the future, and then our role is to provide the support for them to do that. So we have in place financial support structures for bringing people into graduate programs at our university. We have discussions going on with some other entities about infusing pieces of our program into their programs at their universities, trying to be as flexible as we can to provide this leadership development in the forms of doctoral degrees in both Ph.D. and Ed.D. formats. So we have a lot of that information up on our Web site. I put some brochures out. If you want more information about the graduate program aspect of our goals, you can get some information from the Web site. And mostly you can get contact information for answers to your questions because there's no way you could put all of that up for everyone to see. The second goal we have is the development and

dissemination of high quality professional development in our focus area. And the way we're addressing that is through the development of these education specialists. One of their roles in our center is developing and providing professional development. So, again, we have a common connection there of us having people who are willing to make these connections to grow in their ability to provide professional development. And you have the people that they need to be interacting with to find out whether they're doing a good job of professional development or not. So this connection is an important one, I think, for both of us as well. And we're really just beginning our forays into that. We had a cohort of 73 people this first summer to begin our 12-hour ITS coursework component. About 30 of those people are going on with graduate work in a graduate degree program. The rest of them are using what they've learned in the context that they're in and continuing to communicate with us. So we have a large group of people and if you want to know more about that, Chris Komer (?) was in our cohort this summer, and she's here and that's the best place to get information about what actually goes on in the coursework and the classwork. And our third goal that connects these two things is that we're supposed to produce—create—new knowledge about how information technology helps people teach and learn science. And that research, of course, we want to come from the activities of these graduate students and faculty who are involved in our center and in our connections with other people and things that are going on. We're doing that through what we call project teams. And we have scientists from—the way Texas A&M is set up, we have scientists in nearly every college on our campus. So we have geoscience, we have veterinary science, we have the life sciences, we have—Tim's the assistant

director and he's going to tell me everything I need to know. Engineering, right? We have engineering. And then we have the regular college of science. So they're all over the place, which is really exciting for us and really, really difficult at the same time. We have a biology team that involves biologists and a faculty member from wildlife and fishery science, which is in the college of agriculture. We have a chemistry team, which right now is pretty closely chemistry but we're working on getting them connected to some others. We have what is called a risk assessment team; they're studying risk assessment in the environment—I call them environmental science often with schools just so it'll be more familiar—led by a civil engineer and agricultural engineer. We have a math-physics team that's coordinated by some mathematicians in both applied and theoretical fields. And we have a geoscience team, which is led by six faculty members. I think only two of them are in the same subject area. So we're talking about oceanography, meteorology, all of those kinds of things altogether. So the, our research comes from the participants interacting in with these project teams as a combination of scientists, educators, graduate students in both science and education, and classroom teachers. So the summer component is a time for them to mix together, to interact with each other, to learn from each other, to make some decisions about where they want to go on in their program. And after this 12-hour, two-summer component of ITS work, we award them a certificate and we, hopefully, move them into a graduate program in either the sciences with an education component worked in or in education with a heavy emphasis on science. So more information is on the Web site or from the people who have been involved, and I hope to talk to you, much more of you, about connections and opportunities.

Brown: I think she said that she was preparing people to replace us. I'm not too sure—I didn't know she was going to get that personal. But I thought I heard that. But I believe also that there's another institution in Texas, in Austin, that Kamil Jbeily is professor. And we'd like to hear what's going on at the other institution.

Jbeily: Thank you very much. I, in turn, want to commend NSF for bringing people together and SEDL leadership at the state level and the regional level has been exemplary in bringing good programs together. And I think they ought to be commended. Again, my name is Kamil Jbeily. I'm Director of the Texas Regional Collaborative for Excellence in Science Teaching. This program is sponsored partially by the National Science Foundation under a component that we call Project ESTT, which stands for Empowered Science Teachers of Texas. The partnership brings together many entities including NSF, U.S. Department of Education Eisenhower program, the colleges and universities across the state, school districts, the business community. With one mission in mind, and that is to support our teachers with sustained and high intensity professional development so that they can make science more interesting, more relevant, and more exciting to our students. So the mission of the program is very clear. That is to support teachers. And the way we achieve this vision is through very fundamental, basic core values that we believe in, including serving our customers—the teachers and educators of Texas. Treasuring our people—the business people working with higher education, policy makers, administrators, the community at large. Operating with integrity, meaning we tell teachers we're going to respond to your needs. They are involved in the development and implementation of the program. We reward our partners.

We want to make sure that people who are investing in this program see the return on their investments. And this is absolutely critical as we bring in collaborations among all parties in the educational system. And, finally, we contribute to systemic reform and to the community. We achieve those—vision, the mission, and those values—by doing numerous activities. One of them is across the state, we have what we call a regional collaborative, that are partnerships that bring these entities together. They work as a team. In other words, an instructional team made up of a professor of science, a professor of education, master teachers, and science specialists. And that instructional team provides a professional development program we call PDP that is made up of 105 contact hours minimum a year. So those are provided in the regions. We have 21 regional collaboratives across the state that support science teachers. Those instructional teams, we provide them with what we call professional development academies because as you all know, we need to model lifelong learning. So the professors of science, professors of education, master teachers, the specialists, we bring them together into a state-of-the-art training on technology integrations and standards-based curriculum, exemplary material to be used, equity, access, constructivism, inquiry learning, the common threads of contemporary science education. We provide professional development academies to the providers of professional development in the region. Another activity that we do because we believe that we have to honor our teachers, number one, and number two, we believe that education is everybody's business. So we do what we call honoring the teachers event, and there are many purposes behind those events. Essentially we bring people together to tell our teachers who contribute their own time

and energy in professional development thank you, we recognize you, we honor you. We invite policy makers, state senators, representatives, to be the keynote speakers and therefore we engage the people who are making policies in the state capitol regarding science education and education in general. We recognize the teachers with a certificate that is so simple, given by the senate—a certificate of achievement. Another certificate from the commissioner of education. We celebrate the partnership by recognizing our business leaders who are investing in this program. And we publicize the program through media as well as recognize the administrators who are supporting our teachers to participate in this professional development. Those events have been very successful in making sure that education is everybody's business and engage all the components of the educational system and the community. We do annual meetings where we also provide opportunities for interregional collaboration. We bring in nationally recognized speakers so that we can hear about recent developments in science education. Luther Williams was one of our keynote speakers several years ago. We bring in presidents of universities as well as leaders at the state and national level. Our geographic distribution is across the state. We have impacted in the last 10 years over 7,000 teachers. Remember, it was sustained professional development, a minimum of 105 contact hours. Each of those teachers are mentoring and we're continuing to provide them with support to mentor five other teachers in their district and their region. We recently received a Toyota USA Foundation grant that also helps us with the mentoring, so continuously we are bringing people together to ensure that our teachers have a support system that is sustained, high intensity, relevant, and that is what we are about—people working together to

support the most important component of the educational system, our teachers. Thank you.

Brown: Thank you very much. Kamil has a lot of passion for what he does. I was trying to get through the line to get my food and it was impossible; he was still telling me about that program all the way through the line. So make sure you ask him a lot of questions after we get through because he only just barely breached the surface of what he's talking about. The last person, but not least, is Dr. William McCarthy, who's internationally really known for his work with students with disabilities. And he's going to tell us about his Regional Alliance. Dr. McCarthy.

McCarthy: Thank you. I'm Bill. The Regional Alliance, as the name implies, is directed at students with disabilities and we're located in west Texas and New Mexico. We've worked in the past with the Texas RFI with Judy Kelly and others. And we're looking forward to having future relationships with the Northern New Mexico RSI and so on. So we're very excited about these future opportunities. But let me tell you just a little bit about what it is we do. First of all, we're kind of all-encompassing. We go from K all the way up to graduate school. But I thought I'd focus mostly in on what we're trying to do from K-12. And the first of these is to develop what we call teacher outreach projects, and by this I mean that we are funding schools/teachers for developing science experiences for their students with disabilities, getting them involved and enthused about science. And I think we have had one math project. Not a whole lot of math, mostly science. And so we've been very successful at doing that. And we've had a very large number spread throughout Texas and New Mexico who have participated in this particular program. We also do summer science

experiences where we're bringing to campuses to get some experience with science, and a fun experience and a learning experience. At the same time we've sponsored these at places such as Doña Ana Community College and New Mexico State where I'm at, and also UNM. We've also developed bridge programs. Most of the time the bridge programs we've been looking at going from high school to college as typical, but we want to expand that now and we want to look at developing some kind of bridge mechanisms from mid-school to high school for students with disabilities. And so we want to expand that focus a little bit. And then we also have sponsored in the past some professional development and in this instance, one of the things that we have discovered and I don't know whether it's universal or not, and that is that SPED teachers and math and science teachers do not necessarily cooperate in terms of teaching science and math to students with disabilities. So one of the things that we're trying to address is developing workshops and so on that will bring the two of them together, find out what they can do in a cooperative manner, develop joint strategies to help students with disabilities succeed in math and science. We feel that that is extremely important. Some of the issues that we've found and are trying to look at and address—one of the things we find out from students with disabilities is that a lot of times they're put into what we call math and science appreciation courses rather than true math and science courses. And we're looking at trying to develop ways to circumvent that or prevent that. We feel that these are very bright students and they can succeed as well as anyone else if they are channeled correctly, and so that's one of the things we're looking at doing is trying to channel that correctly, and then to get the word out that let's include everybody in math and science education.

Inclusion—when we think of SPED, it normally associates with LD, ADD, and so on. You don't see, SPED does not include physical disabilities normally such as wheelchair persons. So there are, it's not encompassing yet everybody seems to think that if it's SPED, it covers all disabilities. And we're trying hard to break that mold and understand that there are other students with disabilities out there as well that do need assistance. Okay? and so we're trying to get students with disabilities included, not just SPED. Okay? so that's another thing that we're looking at very closely. I call the opposite, which is exclusion, and that is having students with disabilities simply told that they don't belong. And that is a very common thing. And so we're trying hard to develop programs that will demystify this. You know, they do belong. Okay? They have as much talent as anybody else and so they should be encouraged along those lines. Uh, one of the strengths that I think we do have and that is parent advocacy. If you can sell the parents, you have a very strong advocate and they will go to bat for you and they will fight for you. The problem in the past is that parents with students with disabilities look upon their son or their daughter as they want them to succeed, they don't think in terms of math and science. What we want to do is say okay, we want them to succeed too, but we want them to succeed in math and science. And certainly those that have the aptitude, let's push them in that direction. Uh, let's see. One of the big problems, I think, that we always have in students with disabilities is disclosure. I think it's very hard to get information. Parents sometimes don't want to share information because they feel that their son or daughter will be stigmatized. Again, that's another thing we would like to look at is trying to overcome, is that there are ways of helping students with disabilities, but

we've got to know. And so that's certainly one area that we're looking at working on. In terms of collaborative efforts, of course any data that you might have that can help students with disabilities, I certainly would welcome. Certainly we would be willing to provide it, what we have. It's not a whole lot at this point in time. We would appreciate, you know, developing systems, for example, where we have standardized tests and you kind of break it apart where you have special ed standardized and standardized. In other words, the results are normally subdivided. I personally would like to see it be one. And I would like to work toward that end so that we're saying to students with disabilities you can achieve at the same level as anyone else if you're properly motivated. And so I would like to see that. So activities like that, I think, are very important. And I guess with that, my six minutes are about up. So I think I'll stop.

**Brown:** Thank you very much. At this point, we really want to open it up to you. And so what I'd like to do is if any of you have questions, you can ask questions of the panel. If you have examples of how you have collaborated with any of the people up here or any of the centers or teacher enhancement programs, any other types of projects—the SSIs—in your own communities, you can share those. Are there questions or examples of how we can better communicate? Or are communicating? Boy, that went over big, didn't it? There's one.

**A:** My first role was as special ed teacher, but through the regional collaborative about '92 under the leadership of Dr. Ramirez down in Brownsville, I started working and now I have a master's in curriculum and instruction with an emphasis in secondary science. We've come a long way in 10 years and so we've been talking about, we special ed teachers sometimes came through the

back door. But with the regional collaborative, they opened their arms to us. And we're now very involved in science. And I'm a mentor teacher now. So all kids—all kids—have science in Brownsville. So now I work with not five, but 300.

Jbeily: That's what we like to hear. I can add to that. This is absolutely inspirational to me to see so many teachers across the state of Texas who are really empowered, and I mean by that, they have acquired the courage to take the risk and do things differently in the classroom. Equally important, really a culture of collaboration that reaches out and brings it to the teachers, to the students, to the administrators. We have teacher mentors who go and make presentations to their school board about the kinds of support systems that they have. So that is a clear indication why we have to have leadership at every level—at the school level, at the campus level, at the district, at the regional, at the state, of course at the national level, with a commitment of a culture of collaboration that is sustained, that focuses on people rather than organizations only. We've all got to be inclusive as we heard here. We've got to be synergistic. We've got to be symbiotic, our relationship. We've got to respectfully communicate with people. We've got to listen to people. If you ask me what the most important part really of any collaborative effort is communication. Bottom line, it's communication. It's people working together, so I commend our teacher. And we have many, many great examples across the state. I think Chris wants to talk.

Chris Comer: Yeah, Kamil, I want to say I'm an example as well because I was a collaborative member before I came to my job at the state department. And our collaboratives work quite closely also with our teacher center that we have for

professional development. And we have a new collaborative from our rural systemic, which is San Angelo that is also working with our regional collaboratives. I like to say that the regional collaboratives are the crown jewel of professional development. Because it is that 105-150 hours of sustained professional development with follow-up mentorship that indeed is providing the leaders of science education in the state. And so I'm also very proud to have been a part of that. And with the ITS Center, I want to say that this next summer we're putting together a professional development packet that very much is modeled after what I learned through that summer—the three weeks that I spent at A&M and the information technology and what it can do for teachers. And it'll be a statewide effort that we'll do for teachers, so the impact is tremendous and the communication between these projects has been very good as well.

Schielack: Chris, I think you're an example of what we need to build from, the connections between people who are involved in various projects and then examples of people so they're not feeling like—it always bothers me when people feel like they have to choose one or the other or do I do this or do I do that. And the idea is to try to bring the strengths of them altogether. One of the things we're wanting to do is provide information about how information technology is used, but also to provide people with credentials for other types of positions if that's what they're interested in. And so when you said symbiotic, that's exactly the word that we're talking about in all of these kinds of things.

A: Well, we at Rice University have enjoyed working with the Dana Center, which is a statewide systemic initiative. We've enjoyed collaborating in writing

the TEKS team institutes, but more than that, taking those institutes and bringing them to the Houston area, training local leaders, helping teachers understand the philosophy behind them, training them, and then actually seeing in the classroom the changes that those high quality institutes have made. The assessment documents—I could go on. The algebra study that they did statewide. So we at Rice have enjoyed working with the statewide systemic initiative. And now that Houston got an urban systemic initiative taking what we've done with the Dana Center and making sure that all the Houston area teachers have access to this wonderful curriculum. So we've been working, I guess, at the state level and at the Houston level with NSF programs. And we ourselves originated from seed money from NSF, so the Rice University school of mathematics project now in its 16th year was initially funded by NSF so teacher enhancement—we were real pleased. But I hope that funding for institutions like the Dana Center will continue and these urban systemic initiatives in light of what's happened initially because with Eisenhower funds maybe changing, it's important that the momentum that started with these high quality centers continue.

A: Albert wants me to say something, so I'm going to. I'm concerned because I come from [working with] rural school districts. And we certainly see the value of the collaboration, but without really necessarily papering over issues and really facing what is wrong with a lot of things that are happening, there's a tremendous reluctance on the part of universities to really enter the partnership arena with the fact that they, too, will change. There's a lot of rhetoric attached to proposals. And, in reality, my concern will be particularly with the new partnership issue. How do we really hold them to be accountable

for the fact that indeed there will be substantial change. Because we know for a fact that in many respects their products are having to be retooled. We have to really re-energize, give them a lot of skills. Even after they leave the service programs. And we all know that. And we tend to think right now that somehow with there being collaborative and maybe even taking a very major role in perhaps shaping those partnerships, we need to be aware of the problem that may occur when, again, we revert back to the old model of the university being responsible for things where, indeed, they approach the table with the fact that they won't change. They're going to be business as usual. And it's a real serious problem, and we're concerned about that. And perhaps maybe even without asking you in terms of, what do you see as perhaps ways in which the collaborations can embed within those decisions some things that will really hold universities accountable for changing?

Brown: Very good question.

Schielack: Okay, as the higher ed source here—I don't know if you saw me laughing when you said that they'll have to change. I was laughing because I've watched that process over the past year. We've been working with our project teams and, believe it or not, there are people at the higher institutions who do want to change. I mean, they're there. And part of what has to happen to begin this process is providing an environment for which people can come and work together and see if it's safe in changing. And that, what we found at the ITS center is that we've essentially created an environment outside of everyone's normal working venue. It is not in the college of education, it is not in the college of science, it is not in any college at all; it is an entity within itself and it has components of all of these people and goals are related to goals for both

the scientists and the educators and the public school personnel that are involved in this. So what I have learned in my past year is that this desire for changing and working and collaborating is, I think, very much dependent on the environment in which you are doing it in. And so one of the things that I think NSF is trying to do is provide some support to create those new and unique environments that will provide a safe space for those discussions to take place.

Anderson: I was going to say that it seems to me that there are major changes in some universities. And a hope different philosophy is occurring. I'd like to particularly commend the UTeach program at the University of Texas. The UTeach program takes the students in the college of natural sciences, gives them a modest amount of education courses over time—some 18 hours—lets them get certified after doing practice teaching. But these are students who are in the college of natural sciences. And my understanding of their success, the first, is just getting to the level where they're starting to have some graduates, is that 36 of the first 38 people in the program took jobs in secondary teaching in math and science. This addresses a really major problem because we simply do not have in our country a process to produce an adequate supply of well-trained secondary teachers in math and science. And I commend UT for their initiative in doing this. It was a kind of collaborative effort between the college of natural sciences and some of their leaders and the college of education which endorses the process. Not all colleges of education are going to endorse it because they lose some control.

Brown: Kamil?

Jbeily: Pragmatically in the absence of a merit and promotion system that rewards the participation of professors in K-12 education, this participation continues to be a challenge. However, with challenges come opportunities. In every university that we have worked with across the state of Texas, you can identify one or two professors who are interested in working with teachers. Many of them are professors of science. So until we change that merit and promotion system that rewards and provides incentives and puts pressure points on professors of science to participate in K-12, I think we need to work with the strength that we have. Those advocates of teacher preparation working with teachers and bring them to the picture. And utilize their talents and their contributions. And also set up some dialogues with them. Even we were talking—Ann and I—earlier about participation of mathematicians. She told me well, they come and give the presentation and they leave. I think there are opportunities of engaging them in other components of the program that you're doing, where you engage them and you're not—maybe it's a social opportunity like the teacher event that I was talking to you about. When people get comfortable with working with each other and explore and dialogue about mutually beneficial projects where they could be part of it. It's a challenge and we need to really continue to take that challenge with innovative ways.

Schielack: Can I add one more thing?

Brown: Go ahead.

Schielack: I don't know how many of you are aware of this or not, but almost every grant that a scientist or mathematician applies for today, whether it's NIH or NSF or whatever agency happens to be, particularly if it's a national governmental agency, has a requirement for an outreach component in that grant, no matter

what it's about. Now what we're finding at our university is that we are being able to provide a real service to the people who are applying for those kinds of grants because it's not that they don't want to do those things; as Kamil said, they often don't know how and need some help and support. So partly what I think all of us need to do is to take that opportunity, take advantage of that opportunity that all of these scientists who are looking for grant money have this need to, and make sure that that engagement is meaningful as opposed to surface.

Brown: I think this same question is being asked at all levels. I've heard the discussion at the National Science Board, which is the board for the National Science Foundation. And everyone is concerned about the reward system. Everyone is concerned about what can be done and some people have even said benchmarks. If we can even get 10 percent of the scientists and engineers involved, then we would have made headway. As Kamil said, at each institution there are one or two people. But that doesn't bring about a culture change. What you're talking about is really a cultural change. Stephen had—oh, I'm sorry.

A: I guess I'd like to challenge the panel to take a little, go a little different direction for a minute and think about—one of the reasons we wanted you guys to come is these people represent projects in one part of NSF and you people represent projects in another whole part of NSF. It's quite a lot of you out there in the field that these folks could be communicating with over time. And one of the issues we struggled with was this is a great conversation among people with like problems, but you also have those problems and you share them. So how do we build bridges between programs that have these

mandates and programs that have your mandates. And so I guess I'd like to hear a little thinking about are there ways to do that, have you seen ways to do that, and particularly for future conferences like this where there's going to be a regional meeting when we work with a significant group of people and then you can't work with everybody. So how do you build some representation and build some bridges across. So I'd like to ask, if you could take a few minutes to think about that, I'd appreciate it.

Brown: McCarthy, you were going to speak.

McCarthy: Well, I guess I can talk to Steve, but I just wanted to mention about Carlos. The state of New Mexico in the last two years has suddenly awakened to this very problem and the fact that you go to the universities and they're not very responsive. And so for the first time the Commission on Higher Education is calling for strong collaborative efforts. Now whether that actually translates into action or not is a whole different thing. But at least they're starting to push. And so I'm thinking that there are hopeful signs out there that this may indeed happen. In terms of collaboration, I think that in my instance when we're talking students with disabilities, I would kind of like to know what works in each of your collaboratives or initiatives that could be applied universally to students with—all students, including students with disabilities. And so I would certainly be interested in knowing and understanding these mechanisms.

Schielack: I'm going to ask Judy Kelly to respond to that question about, Judy, what we were—I mean, I can do it but do you want to talk about the connection that we were talking about in terms of the data and the research a little while ago?

Judy Kelly: Are you talking about our conference that we're planning?

Schielack: No, I was actually talking about—well, we can talk —. I'm sorry. It was in our discussion this morning that we were looking at data from schools and talking about how do you get programs and projects connected, and one of our goals is providing research and information about what is working and what isn't, as Dr. McCarthy said. And Judy and I were just sort of brainstorming ideas about how to use the immense amount of data that's coming out of the RSI and the kinds of things that they've collected, and using some of our graduate students and faculty members for organizing that data in terms of the form of presentations.

Judy Kelly: What we want to do is make a tie to the researchers, the education researchers in the colleges of ed and all of our partner institutions. The rural systemic initiatives are built on the Texas A&M University System, plus other partners like Angelo State University. And there are education researchers that are looking for data that's out there. And so we feel like we can provide the data, help them with the research questions, and then let them as being kind of independent of our project, come in and look at and help us examine what is it that we're really doing for our best practices. And so we feel like that's a new opportunity for us. The other opportunity, I think, that's there is to partner across NSF initiatives. And I think we've set a model for that. When we started working with NSF, our first project was a planning grant for a collaborative for excellence in teacher preparation. And as we worked through that process and eventually got a project for excellence in the preparation of teachers, we've connected projects. So what we've done is try to look at the problem K-20 and think about what can we do to address each of these problems but not address them in independent ways, but address them in connective ways. And so we

have, as a part of the A&M System, the TexSIP project, and the faculty members that are working on changing the way they're teaching their content classes are also involved with us in the rural systemic initiative. They're also involved with us in a GK-12 project. I was telling someone the story of how a university chemistry professor at Texas A&M University developed a new way of doing some hands-on activities in his university class. He then shared that with our GK-12 fellow that works out of Texas A&M-Corpus Christi, who in turn took that to Beeville ISD which is one of our largest RSI schools. Did that with an IPC class and just totally amazed the teacher there with what students could learn and which students could learn. So what you've got is people from the university a part of a collaborative for excellence in teacher preparation working with a GK-12 project, who is embedded in a rural systemic school. And all of them working together to impact first, the people that are just around them. But then because of the mechanism of sharing, they're able to impact other people in different projects. So I think that's what the collaboration is about. It's working across the projects.

Brown: Okay. We're going to be running out of time. What I'd like to do is to have each one of you make some closing remarks, and so everybody will get a chance.

Anderson: I was going to second the comment that Bill McCarthy made, that universities are in fact changing, in part under the pressure from the federal government which is making university systems and so on pay attention to teacher preparation issues that everybody outside education had largely ignored. In Louisiana we have a very, the Board of Regents for Higher Education has a very positive position based upon recommendations from the so-called Blue

Ribbon Commission to force whole universities to think hard and be responsible for teacher preparation, not just delegate it to the college of education. And I think that kind of collaborative effort at the university level is bound in the long run to result in a far better thought-out process for the preparation, particularly of secondary school math and science teachers.

Brown: Jane?

Schielack: Well, in our discussion this morning we were looking at the attributes of a professional learning community, and one of the components that stuck out to me were these shared and common goals. And I think that's what we're all talking about, is that we really have a shared goal and that's to have a more educated populace, everybody in math and science and other things as well. And I think if we can build our collaboration around those common goals, then these problems will turn into challenges that we can deal with.

Brown: Kamil?

Jbeily: I think back to Steve's point about how we can really further collaboration, I think it's absolutely critical that we—often the conversation and dialogue among many entities that are involved in systemic reform. For example, the rural systemic initiative, there is an intense collaboration between the rural systemic initiative and the regional collaborative. We work with the Dana Center using many of the exemplary materials that they have developed. For example, we work with Project LIFE—Dr. Anderson and Linda Ramsey and I have been working for the last five years. We use the funds from NSF, from our grant and from your grant to train our East Texas teachers to be mentors. Now two years ago we invited the U.S. Department of Education neighboring states, Region 6, to our annual meeting and we had a sharing session about

how we can work together to explore opportunities that are useful to everybody. See, if you think of this system of education, three Cs characterize it. I call them the change, complexity, and competition. And if you really think about it, you've got to address those three Cs in everything you do. Change—you've got to be lifelong learners. You've got to be informed about what's happening. Complexity—you've got to think systemically and globally to solve all the problems that we have. It's not about teachers only; it's about higher education, it's about business, it's about boards of education, it's about curriculum, assessment, instruction. It's about NSF, U.S. Department—I mean, it's a very complex system and you've got to think systemically and globally. And competition, the way we solve it is through collaboration and synergy where the sum of the parts is greater than the whole. That the sum of the whole is greater than the sum of the parts. That synergy, I think we need to work very hard to achieve it. It's not easy to do that. And we've got to further commitment of people and not depend on compliance. I think for so many years we depended on compliance, which is very short-term. Commitment brings with it passion and commitment to achieving the vision, and people want to do it because they want to do it, not because they have to do it, somebody is coming to monitor them. Thank you.

Brown: NSF will be monitoring them. Dr. McCarthy?

McCarthy: I would just like to add one thing. As Dr. Brown said about the universities, two people does not make true change. And, therefore, what we're looking for is systemic change. And when I look out at the audience here, I see a collective group that has probably more experience about systemic change that can be

brought out to other initiatives like mine and so on and make a true difference and break us or let us or allow us to make a true difference in our area.

Brown: I'd like for you to join me in thanking the outstanding panel that we have.