

In the interview, he talks about his MIST project and their way of working with professional development, while he reflects on the development he has undergone during his research career.

The interview took place at Vanderbilt University December 2014.

Support of learning – a question of organizational learning

Interviewer A: *What is the background for, and the idea behind the MIST project?*

Paul Cobb: The guiding question for the project is: What does it take to support improvement in the quality of math teaching and student learning on a large scale? And in the context of what current US math teaching looks like, and also of what we ourselves value in kids math learning, we think of improvement in terms of teachers not just extending or elaborating what they already doing and reorganizing in their current practice, but rethinking their answers to fundamental questions such as: What does it mean to know and do math? What should the goals for student learning be? How do students learn? The whole bit. It would involve a fundamental reorganization of current practice. Not just an elaboration or extension. So that is the challenge.

So how would you do that? I have done it and a lot of (other) people have done it. A group of researchers going camp out on one or two schools and work very closely with teachers. You can really support their learning if you stay there for an extended period of time, so that is not the question. The question is: How can this be done on a large scale? And the way we think about it is: How can we support the development of school and district capacity to support teachers learning? And when you frame that question, you will be getting into principle's learning, coaching of learning, development of tools, reorganization of routines, the whole bit. So it is also for us a question of organizational learning. It is not either-or. It is not just teachers learning. If you have to support the learning of a large number of teachers, the organization has to learn how to do that. So it is viewing teachers' practices, which are very much influenced by organizational niches, the school context in which they work. So that is the kind of questions we have been interested in. For many years I worked at the classroom level doing

design experiments where we would be responsible for the learning of a group of kids for fifteen weeks or something. And a lot came out of that, not just from my work, but from a lot of other people's work. We made a lot of progress at least in math and science in developing long term trajectories, not just of learning and how to support that learning, but to do so, requires fundamental change for teachers and groups of teachers. And we learned a lot about professional development. But that work had very little impact on US classrooms. If you go into most US math classrooms, you will see very little impact of any of that research. Hence this focus on the sort of broader level or broader scale, so it does fit with this sort of concern with practice. So, that is the basic idea. And also the last thing I did before this was a long-term partnership with two groups of middle school teachers, meaning lower secondary school, teaching kids age 12 to 14, in two districts, where we were working to support their learning. And they did make a lot of progress. These were math teachers and we worked with them for five years. But also in the context of that work we realized ahead of time, that in order to do that work we had to understand the settings in which the teachers were working. So we also collected data about the school and district contexts, and that was critical to us, it actually influenced the design in the group I worked with. So we ended up actually feeding back some of what we were finding about their school leaders without naming them to the teachers and it influenced our work with the teachers as well, because they then formed an agenda to try to influence the settings, in which they worked, so they could be more productive. And so, based on that work, we realized it would be really critical to attend to the whole system, and system as far as we go is the district from kindergarten through the end of high school.

Supporting learning on the whole system level

Interviewer A: *What does it take to support improvement across the system?*

Paul Cobb: We worked with four districts for four years and they ranged from 35,000 to 140,000 students. And then, we continued on for another four years with two more districts, the one with 85,000 students and the

other with 100,000 students. Now, we did try to recruit districts, which were atypical in the US at that time, because they were aiming high in terms of their goals for student learning. They were not just aiming at kids getting through the low level test. They also had higher goals for the kids developing conceptual understanding. And they had teachers with a pretty sophisticated inquiry oriented set of instruction practices.

What we did initially was to go to the district to interview a bunch of district leaders. And if we look at the central offices, there are a number of different departments. So, we interviewed people mainly from two departments initially, which is curriculum instruction and includes the math specialists, and leadership, which is responsible for hiring, moving around and monitoring school leaders. And what we were trying to find out in the initial interviews was: what are the plans, strategies and policies for trying to support improvement. Then we wrote up about five pages on these audio-recorded interviews and we said: Here is what we see as your major strategies. And we actually send that to them saying: Did we get this right? We have to make sure, that from their point of view we understand what they are trying to do. So in other words, our initial points of reference are their strategies. We call these district theories of action. Then we carried out large data collection from January through to March each year, where we collected data to try and document how these policies and strategies are actually playing out in schools and classrooms. We can tell you about some of the data we collect. In the first four years we focused on six schools in each district, and we selected them in consultation with the districts locals: Here, we want a representative group of schools. We wanted to be representative in terms of capacity for improvement. So we did not want the weakest schools and we did not want the strongest schools. We do not want to tell a story about successful schools in the district. We want to be representative. And then, within that we randomly selected a total of 30 teachers in each district, so we have 120 teachers altogether. We organize getting two consecutive lessons video-recorded in each of their classrooms. The success of that is near to 100 % in every district, every year. Then we went to each district for a week, and we do 50 audio-recorded interviews with teachers, school leaders and coaches. Then the coaches, the principals and the teachers do online surveys complementing the interviews. And what we are trying to get at is: What is it like to be a teacher, or a principal or a coach in this

district? What are the supports, both formal and informal, improving teaching? What do you perceive yourself accountable for? To whom are you accountable? What tools do you use as part of your practice? That sort of thing. What is happening on the ground? And there is a measure developed at the University of Michigan on mathematical knowledge for teaching, which has been shown to be related to student achievement. The teachers and the coaches use this measure. We are also videoing professional development. And when teachers meet in collaboration, they audio-recorded their own meetings and then sent us the tapes. And then, as we are also interested in teachers' informal networks, we have an online network survey: Who do you turn to when you have an issue or a question? What did you talk to them about? And so on. That was online. And for that, it is not just 120, for network data you have to get everybody in a school, 300 teachers. And then the schools provide all of their student achievement data so we can link teachers and kids participating in the teachers' classroom. So we get all of that every year. So to give you an idea of the scale, as of now, because we have done this for a large number of years, we now have 1,700 fully coded videos, so it is a big longitudinal database. And they are all coded and we do that every summer.

What we have to do between the January interviews and May is analyze the 200 interviews and write a feedback report for each district, and these are separate. They do not just look alike. Each one is specific to each district. And the reason that we have to do that by May is because it is the beginning of the summer. School leaders and district leaders in this country typically make plans for the following year over the summer, so we do that and then we send these back to them and then we go a week later to each district, and then we meet with senior district leaders to talk it through and discuss implications for the coming year and I should just explain. We did this for four districts for four years and then we went down to two districts and we worked with them even more closely by jointly designing and leading professional development work. We doubled the number of teachers to have adequate statistical power. And doubled the number of schools as well, so we had 25 schools. In total about 200 participants.