

## Exploring Teacher Change

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*As part of the GE Foundation's Math Excellence (ME) Program, projects sought to increase teacher use of student-centered instructional strategies<sup>1</sup> and of science and math career information. These lessons learned from their efforts can help improve the design and implementation of teacher professional development.*

When we consider the effectiveness of efforts to change teacher behavior, we usually look at averages, asking, for instance: “What is the amount of change for the group as a whole?” Answers to such a question are useful but incomplete. As the two results below indicate, looking at both individual and group change can provide different understandings of the same data and suggest different conclusions:

- After participating in ME, teachers on average significantly increased their use of math and science career information from 2.4 to 2.6 on a scale of 1=Never to 4=Almost Always.
- After participating in ME, 49% of teachers increased their use of math and science career information, while 25% didn't change and 26% decreased their use.

Similar results were found on teacher use of student-centered instructional strategies. After participating in ME, teachers on average increased their use of student centered instructional strategies from 2.2 to 2.3 with 55% of teachers becoming more student-centered in their teaching, 10% not changing and 35% becoming less student-centered.

Overall, the results are positive. On average, teachers are using both more math and science career information and more student-centered strategies. Individually, about half have changed in positive directions. However, the examination of individual teacher change reminds us of the complexity of teacher change. And it challenges us to learn more about the teachers who didn't change and those who changed in a negative direction.

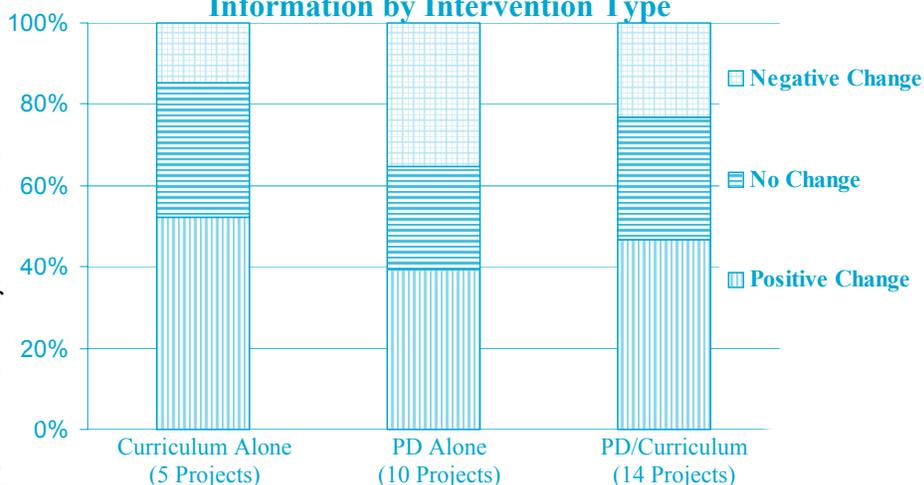
### What Makes A Difference?

Across ME projects some things did not make a difference. Teacher change was not based on their years of teaching experience, the subject they were teaching or whether they were teaching at elementary, secondary or college levels, although those teaching at the college level were less apt than others to increase their use of math and science career information.

**Including Curriculum** Providing teachers with curriculum made a difference. ME projects with curriculum components, regardless of whether they included professional development, were significantly more successful at increasing teacher use of science and math career information.

<sup>1</sup>Sample student centered instructional strategies include having students explain their problem solving strategies and having them work on problems for which there is no immediately obvious method of solution.

### Changes in Teacher Classroom Use of Career Information by Intervention Type



Curriculum improved teacher use of student-centered instructional strategies as well. Seventy percent of teachers in projects that only provided curriculum materials and 66% of teachers in projects with professional development and curriculum materials, increased their use of student-centered instructional strategies. This compared to less than half (46%) of teachers who received professional development alone. Other work has found that curriculum counts in terms of increasing student science and math achievement as well as positive teacher change.<sup>2</sup>

**Meeting Individual Teacher Needs** Within ME, as well as within education as a whole, decisions about the content and structure of teacher interventions tend to be based on school, district or national student data rather than on individual teacher strengths and weaknesses. In ME projects where interventions were developed without consideration for what teachers needed to learn, there tended to be problems. For example, in one project where the majority of teachers changed in a negative direction, the cause of low student achievement was assumed to be that "teachers have few resources to motivate students with high aptitude and interest in math" and mandatory professional development was provided to teachers. No planning data were collected regarding the quality or quantity of available resources. Neither were data collected as to whether teachers felt they needed help to motivate students and to improve their achievement. No wonder teachers reported feeling that professional development did not address their needs.

Some ME projects that had not initially considered teacher needs soon discovered their mistake and made changes. As one project's director explained, their intervention "sounded great, but when we actually got into the schools, it was much harder than we expected. It really changed how we approached the whole thing." They used initial meetings with the teachers "to get an indication of where teachers are and where they're heading" and revised their intervention accordingly. Sixty percent of this project's teachers increased both their use of student centered instructional strategies and their use of math and science career information.

Other projects met individual teacher needs by working with teacher volunteers. One ME project had almost two thirds of participating teachers increase their use of math and science career information in their classrooms, with 25% increasing their usage dramatically. Half the teachers also increased their use of student-centered instructional strategies. Participating teachers volunteered for the project and attended an intensive week long summer institute and spring follow up session that combined curriculum development with professional development, motivational speakers and trips

**In Closing** ME projects found it is not enough to look at student achievement and participation data and assume that teacher professional development will improve the situation. Rather one must determine individual teacher strengths, weaknesses, and perceptions of their own needs. Based on that information, more effective interventions can be designed. One size does not fit all.

<sup>2</sup>Clewell, Beatriz Chu & Campbell, Patricia B. (2005). What do we know?: Seeking effective math & science instruction. Washington, DC: Urban Institute. [www.urban.org/UploadedPDF/411149.pdf](http://www.urban.org/UploadedPDF/411149.pdf)