

Contribution to Research Skills and Experience:

As discussed extensively in the “Activities” section of this report, the MASTEP Project resulted in the development or revision of a large number of STEM courses at our six colleges/universities. Each of these courses incorporated new approaches to teaching and learning in order to provide better instruction and to model preferred approaches for students planning on becoming K-12 teachers (and secondarily to all students in the reformed courses). As part of our evaluation efforts, we introduced two ways that our faculty could become involved in educational research to track the effectiveness of the reform efforts. The vast majority of these faculty had not participated in “educational” research prior to MASTEP.

First, our outside evaluators (WestEd from San Francisco) routinely tracked both student and faculty reactions to the newly reformed courses, both by interviews and by written surveys. The faculty themselves administered the surveys in their courses, WestEd analyzed the results, and the outcomes were shared with the faculty and the Project leadership. During this participation in collecting and reviewing the evaluation data, our faculty became much better informed about how to monitor attitudes and improved performance in their student populations. Most faculty used the data to further refine their teaching approaches, which was an important purpose of our evaluation efforts from the outset of the Project.

Second, some of the above faculty became so interested in the learning outcomes of their students that they embarked on their own educational research efforts to more extensively monitor their reform efforts. In Year Two of MASTEP we provided an all day workshop on approaches to evaluation that was offered by our WestEd evaluators. The purpose was to introduce the fundamentals of valid educational research so that our STEM faculty could design an appropriate study for use in their courses. Some faculty have continued to collect data over several years and have presented the data at meetings or submitted papers for publication.

The undergraduate and graduate students, including future teachers, who have taken the reformed courses that we were monitoring have experienced directly how an educational researcher collects valid data. It seems likely to us that these experiences may

have influenced the thinking of these students and may have interested some of them to participate in such research in the future.

In addition to the educational evaluation efforts above, MASTEP also encouraged future teachers to enroll in independent study courses in order to learn the elements of scientific research. Furthermore, our faculty incorporated into their courses approaches such as directed-inquiry and open-ended problem solving. These approaches mirror scientific methodologies and thus teach students about research techniques.

Our K-12 teachers and participating mentor teachers were also involved with the WestEd evaluation efforts. WestEd routinely interviewed, observed, and had surveys distributed, in our teachers' courses. As with college faculty, these teachers had to become more informed about how educational evaluations and research take place as a result of their participation in it. Combine this participation with the stress we place in our teacher preparation coursework on why classroom teachers should monitor the effectiveness of their own teaching regularly (such as through "action research"), and we are confident that our new K-12 teachers are much better informed about research as result of MASTEP efforts.

Contribution to Teaching Skills and Experiences:

The primary objective of the entire MASTEP Project was to expand and improve the teaching skills and experiences of all of our participants. The above sections on "Activities" and "Findings" document our efforts in detail, but the principal components to accomplish this objective were: workshops for faculty, improved (i.e., reformed) STEM courses that model effective teaching and learning, improved curricula in our teacher preparation programs, and reinforcement of good instructional practices in our New Teacher Support Networks and Future Teacher Clubs.