



Impact Report: Differentiated Learning through TeacherMate Technology in Central Texas

Summary:

A Demonstration Project using TeacherMate handheld learning devices was undertaken in the 2009-2010 school year in three Central Texas schools districts. The feedback received from teachers and students has been very positive; however there were some technical hurdles with the devices that are still limiting their consistent use and success in the classroom. All districts and classrooms enthusiastically agreed to use TeacherMates in their classrooms for a second year. Various reading and math assessments were used across the three districts and compared to control classrooms as well as previous year results. Quantitative analysis of the results was significantly delayed because of data unavailability, staff turnover, and budget cuts. Final results are shared below. While they are moderately positive overall, they indicate that broader studies with more controlled assessment and data collection is warranted before we can recommend significantly greater investments in use of TeacherMates.

Evaluation of the program / project's success in meeting the goals outlined in the funding proposal:

Outcome 1: Improvement in reading and math assessments

Status: 2

Description of Progress:

As reported by one district, the use of TeacherMates (TM's) was found to correlate with higher assessment scores for students of different types and ages. For instance, one participating Round Rock campus had six first grade teachers who participated in the 09-10 demonstration project and were teaching at the same school the prior year (08-09) without TM's. In 08-09, the average improvement in DRA scores over the course of the school year was 10.790. In the year when TM's were used, the average DRA increase was 12.765, or a marked 18% increase in improvement over the course of a year.

However, an external evaluation of Words Correct per Minute for Round Rock (See attached study Fuller, 2011) included all teacher and not just repeating teachers. The new TM teachers, who were sharing units, experienced technical difficulties that made deployment slow and inconsistent. When looking across all teachers, TeacherMate outcomes were positive but not large enough to be considered statistically significant. Regression analysis of students outcomes based on inclusion or not in a classroom using TeacherMates, controlling for various variables such as performance at beginning of year suggested **a possible positive effect of being in a TM classroom.**

In Bastrop, significant ceiling effects and lack of differentiation in scores made data unusable for a statistically significant analysis.

In Pflugerville, the Dibels test was used to assess reading and AIMS for math. An analysis of outcomes in reading based on fixed teacher effects resulted in a **statistically significant and positive association between usage of TM and gains in reading achievement from 2009 to 2010.** However, because of the relatively small sample size, the results of the analysis employing teacher fixed effects must be interpreted with caution. The analysis for mathematics suggests not only that teacher usage of TM was associated with a **statistically significant and positive effect on student gains over**

the course of the year, but that the effect of the TM usage was moderate to strong. This certainly suggests that further exploration of the effects of TM usage in mathematics classrooms is warranted.

Measure 1a: Net change in TPRI (Texas Primary Reading Inventory) scores from beginning to middle to end of year for TeacherMate students versus comparison students and classrooms.

Status: 2

Description of Progress:

Because grant funding came in later than expected and TM's could not be implemented until November, we chose to evaluate results using only beginning of year and end of year assessments. This also provided more consistent year on year comparison as most districts do mid-year assessment for only some students. In addition, districts used multiple assessment tools, so we had to analyze results using DIBELS, DRA, TPRI, and Tejas Lee (for Spanish speakers) and TEMI-O and AIMSWeb in math. Some of these assessment were used for such small sample sizes that valid analyses could not be undertaken.

While there was no consistent evidence across districts, grade levels, or subject areas that using the TM was associated with greater gains in student achievement, ***there was some promising evidence that usage of the TM is positively associated with increased student achievement.*** Indeed, two of the five studies conducted found a statistically significant and positive effect and the two effects were fairly powerful even after controlling for a host of other variables such as prior scores and student demographics. Importantly, the two studies that did find an effect were the two studies with the best available data with respect to student scores and other control factors available to use in the regression analyses.

The two positive study results are promising and suggest that a larger and much more rigorous implementation and evaluation be conducted. Resources need to be available to districts to ensure that the proper tests are administered and data is collected systematically, with more accurate data collection and test administration.

Measure 1b: Net change in math assessments versus comparison students and classrooms. Note: there is no standard, objective math assessment for the state at the K-2 level. Therefore, each district (and school) must work with the assessment team to determine how to appropriately compare student outcomes based on local tests.

Status: 2

Description of Progress:

See above summary results.

Outcome 2: Improvement in teaching effectiveness and support

Status: 3

Description of Progress:

Classroom observations and online surveys were used to evaluate impact on teaching. Almost all feedback was positive, e.g.:

"TeacherMates are definitely enhancing my students' learning. I am confident that their time with the TeacherMates is well spent."
"TeacherMates have created a feeling of learning by being hands-on."

Students also reported positive feedback:

"I love all the games."
"I like that the reading stories have a quiz at the end."

The positive effect on teaching was related not just to individualized learning of students, but in freeing up teachers to work with small student groups or one on one while others

were positively occupied with their TM's. Multiple teachers remarked that a significant benefit was that they get to work with small groups in a concentrated fashion with a minimum of student interruption. Also, it was reported that the TM's allowed students to learn to work more independently and to learn choice and responsibility.

We found that ramp up time and impact on teaching did vary. Negative responses were mostly around technology issues (specifically, difficulties in sharing units across multiple classrooms and synching information cleanly). Also, teachers reported some students getting distracted or bored after prolonged usage (20+ minutes; this is typical for any type of task learning for children of this age). Nevertheless, every teacher reported wanting to use TM's again in their classrooms the following year.

Measure 2a: Based on the 2009 pilot study, a teacher survey and classroom observation methodology will be developed and implemented to assess teacher acceptance, value in the classroom environment, and effective use of teaching time.

Status: 3

Description of Progress:

Qualitative analysis was based on:

- input from project participants through surveys
- comparison of notes and findings through the project Wiki site
- classroom walk-throughs and evaluation by external parties using a common observation protocol.

These methods were designed to identify patterns of usage, consistency of application, time on task, groupings (e.g. one on one, small group, whole class) as well as student engagement and students and teacher perception.

Students were found to "demonstrate a high level of engagement" when using the units for the relatively short periods of time (e.g. no more than 15-20 minutes) recommended. Many teachers reported that they believed that use of the TM's had a direct and positive impact on both reading and math skills, especially with English Language Learners. This type of protocol is probably too expensive and intense to be undertaken with every teacher every year, but should be continued on a sample basis to identify and compare ways to continue to improve usage.

Outcome 3: Scaled regional implementation plan

Status: 2

Description of Progress:

We undertook the TM Demonstration Project in three school districts, purposefully designing the project to test Kindergarten, 1st and 2nd grades as well as English-only and bilingual classrooms and Title I and non Title I classrooms. This variety allowed us to have data on all types of classrooms as a basis for regional planning.

Throughout the course of the demonstration, district leaders from six other E3 Alliance partner districts were informed of progress at regular regional meetings. Some complained that they weren't part of the demonstration project and vied to be first in any expansion plan.

In addition to creating a platform for regional scaling, there has been interest in state-supported expansion. Representative Mark Strama visited some Round Rock classrooms in December 2009 to view the project first hand. He and other legislators are particularly interested in this model because it is one of the few that utilizes technology to truly individualize instruction.

Measure 3a: E3 Alliance, based on teacher effectiveness study, student results, and active collaboration with three demonstration districts and six additional partnering

districts, will define a plan for scaled implementation, including budget and recommendations for best implementation methodology.

Status: 2

Description of Progress:

Based on the overall positive feedback received and initial student assessment data, E3 Alliance staff worked with districts to identify best mechanisms to scale beyond the original 95 classrooms and 1500 students. However, just as positive feedback was being collected, the dire budget implications at a state and local level became clear. In the fall of 2010 we started to modify the regional plan to scale at a slower rate. Once the Comptroller's state revenue projections came in and the full ramifications of budget cuts were clear, it was apparent that we can't expect to expand this work in the coming biennium. Not only has all investment money been slashed, but personnel remain in limbo. A number of teachers who were part of the demonstration project have had their contracts terminated. All three primary project contacts with the districts have either changed positions or left the district.

The good news is that the capital investment for the units has been made and they can continue to be used in classrooms for years to come. Therefore, the current intent is to utilize the existing investment but not expand beyond these three districts until district changes settle down and there is bandwidth to consider other options via private funding, state funding, or district-specific capital bond packages.

Best Practices:

Participating teachers and district staff were able to monitor project progress, share results, report issues and ask questions of each other through a project wiki space <http://e3-teachermate.wikispaces.com/home> set up by the Round Rock district. This tool was simple and easy to use and allowed project participants to share information both within their own district and with other districts. We found that teachers being able to share information and issues beyond their immediate neighbors was a truly beneficial practice. This same technology was later used with the Target Tech in Texas project, where seven districts participated in a \$1M competitive technology grant together.

More importantly, there is increasing investment being made in technology in the classroom, yet very few of those investments have been shown to be effective in *individualizing student learning* based on student language, learning level, and need. TM's have great potential for positive impact in the classroom because they can individualize learning at an affordable price point. Pending final analytical data, we should be able to build a complete cost/benefit model for TeacherMate usage.

Barriers to Success:

There were multiple barriers to success in this project. First, we had hoped to get the capital investment for the units in early summer 2009 so that they could be used for the entire school year. Grant funds came in later than we expected, and so teacher training couldn't take place until mid October, and by the time units were distributed and in use much of the school year had gone by. While teachers were disappointed that they couldn't take advantage of the TM's for the full year, this makes the any changes in test score all the more impressive. But we cannot gauge impact of a full year's use until 2010-11 test scores can be calculated.

Also, some technical difficulties found in the small 08-09 study were still being exhibited in 09-10. Most of the issues with individual units "freezing" were corrected with software upgrades. But classrooms that shared units still had multiple problems that remained cumbersome, and some teachers had trouble with the progress report monitoring. Districts implemented some procedures designed to make implementation even smoother this school year, and those appear to be working.

Most importantly, however, state and district budget cuts and personnel cuts have made expansion impossible at this time. We hope that when things "settle down" we will be able to re-examine this and look at further expansion.