

TECHNICAL REPORT

Quaker Valley Digital School District

Early Effects and Plans for Future Evaluation

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SUMMARY

BACKGROUND AND PURPOSE

The Quaker Valley School District is one of three districts selected by the Pennsylvania Department of Education to receive a two-year “Digital School District” grant beginning in 2001. Key technology provisions in Quaker Valley’s proposal were to supply laptop computers to every student in grades 3–12, to set up wireless networks in all district buildings and several community sites, and to provide wireless Internet connections in the homes of all students in grades 3–12.

The purpose of this report is twofold. First, we provide a limited evaluation of the implementation and impacts of the Digital School District (DSD) program at the end of the grant period, based on data previously collected by the district and its formative evaluator as well as limited qualitative data collection by RAND during a 3-day site visit. Second, we provide a conceptual framework and Theory of Change describing the Quaker Valley program, and a research design for a future, more comprehensive evaluation of the initiative.

FINDINGS

Reports from teachers and students, as well as classroom observations, revealed wide variation in the use of technology across classrooms, both because the technology is more applicable in some subject areas than in others, and also due to variances among teachers’ comfort and aptitude with the technology. Overall, teachers and students reported competency in several basic software applications after the first year of the grant, and additional competencies after the second year. The laptops engendered some changes in the classroom by acting as a tool for performing functions that were previously done by hand, such as recording attendance and grades, taking notes, and conducting research. However, teachers reported several factors that seemed to hinder the integration of technology into the curriculum. In particular, they expressed the need for additional professional development and technical support to facilitate curricular integration.

Contrary to an expectation that teachers would have more free time for instruction, teachers reported increased clerical and management demands on their time since the implementation of the DSD program. In addition, teachers who put efforts into developing lessons to utilize the technology found this required a large time commitment, with little formal support from the district. Furthermore, because some students would inevitably come to class without computers, many teachers were required to plan alternate activities that could be performed without the computer, adding to teacher workloads. One promising finding was that teachers were taking advantage of a newly implemented online assessment tool that allows them to design and administer customized assessments and track student progress. These assessments provide teachers with rapid feedback on the progress of the class and individual students, enabling teachers to adapt instruction based on these results.

Wide variation was also seen in use of the home Internet connections provided by the district. In general, these connections suffered many technical problems, and difficulties with safeguards made these connections subject to inappropriate use. Overall, the connections were heavily used by only a handful of students and fewer parents. In addition, there were great problems with reliability of the student laptops, particularly at the middle school level. Technical support staff were overwhelmed with support and repair issues, thus shifting the support burden onto teachers and the technology experts who were supposed to be assisting teachers with curriculum and instruction.

Though use of technology varied widely across the district, positive and negative impacts of the technology initiative were seen for many members of the district. Most prominently, students at all grade levels benefited from increased awareness and competence with technology. Motivation and engagement increases were reported for many students, and teachers reported that students had increased confidence, more willingness to work with and teach other students, and improved communication skills. Some students were reported to take more responsibility for their own learning. However, some negative consequences for students were also observed, such as inappropriate use, and for some students, social difficulties due to excessive use of the computers. Positive impacts for teachers included the availability of new materials and activities for lessons, and increased capacity for communication with students, parents, peers, and principals. However, teachers also reported an increase in workload related to using the technology for both administrative and instructional purposes.

PLANNING FUTURE EVALUATION EFFORTS

To provide guidance in planning a future, more comprehensive evaluation of the initiative, we presented a Theory of Change that integrated key aspects of program implementation as discussed in previous research. Based on this hypothesized description of the theory of action underlying the DSD initiative, we developed a set of research questions to guide future evaluation efforts, including a listing of measures to be considered in future data collection to systematically investigate the various causal pathways and outcomes described in the Theory of Change diagram.

We then described various simple analyses that can be performed with this data, such as analyzing achievement trends over time, and discussed the challenge of interpreting and attributing effects that is inherent to program evaluation studies. Three methods were described for designing a comparison group study that would allow strong conclusions about causality to be made. Unfortunately, none of these methods may be practical options for Quaker Valley due to cost or other limitations inherent to the DSD initiative in Quaker Valley, such as lack of necessary baseline data, no identified comparison group or district, consistently high student achievement, and small district size. As a result of these limitations, an evaluation providing high confidence estimates of the impact of the DSD initiative may not be possible.

RECOMMENDATIONS

Though the district may be unable to make reliable conclusions that directly link the DSD initiative to observed effects, much can be learned from a systematic evaluation of the implementation of the DSD program. Based on findings from qualitative analyses, we offer the following recommendations pertaining to program implementation as of the end of the second year of implementation. The district may want to consider these recommendations when planning for the implementation of the initiative in future years:

- Focus professional development on curricular integration of technology.
- Provide an accountability mechanism that clearly states the district's expectations for how the technology will be used in instruction and provides incentives for compliance and consequences for non-compliance with these expectations.

- Increase the level of support staffing, for technical support, troubleshooting, and repair issues as well as for curricular support to assist teachers with integration of technology into their lessons and instruction.
- Reconsider the current policy of uniformly issuing personal laptops to all students across grades 3–12.
- Set up formal mechanisms for all stakeholders to provide input to program administrators, establishing a feedback loop that will help with refining and improving implementation.
- Consider an analysis of the costs of the DSD program along with evaluation of the program’s effects, so that it might be possible to make judgments about the program’s cost effectiveness relative to other programs or interventions the district could potentially implement.

Additional implementation data, collected as part of the ongoing evaluation of the initiative, will likely provide additional recommendations for improving the initiative. In addition, the district should consider the following steps in planning and carrying out a future evaluation of the DSD initiative:

- Consider the Theory of Change presented in this report, and refine it if necessary to ensure it is an accurate model of the DSD program.
- Use the Theory of Change as a framework for identifying measurements related to the various causal pathways, changes in behavior, and outcomes described in the diagram.
- Collect the relevant data over time.
- Monitor data for changes in outcomes of interest and explore all possible reasons why effects may or may not be found related to these outcomes.

The focus of the last four recommendations is for formative evaluation, because to design a persuasive evaluation around the limiting factors of Quaker Valley’s implementation may not be feasible, considering the great expense and need for participation of additional school districts.