A PD3 Tool for Observing Mathematics and Science Instruction

Computer technology can facilitate walkthroughs by making it easier for principals to collect, manage, and review data.

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One of the key challenges to making the most of classroom walkthroughs is collecting, storing, and presenting the data. Technology can make all of these activities much easier by reducing the number of steps it takes from conducting a walkthrough to analyzing the results. Walkthrough software that is compatible with handheld devices such as personal digital assistants (PDAs) and mobile telephones makes it easy to conduct structured walkthroughs at almost anytime. These devices can also store walkthrough data that users can upload to a Web site or download to a desktop for later review and analysis. Several organizations have already developed handheld walkthrough tools, hoping to make the most of these widely available computer technologies.

Beginning in 2005, SRI International and the Miami Museum of Science worked together to develop PD3, Professional Development Decisions Using Data, a walkthrough tool specifically for principals to identify the professional development needs of teachers in the areas of mathematics and science. Use of the tool would also encourage professional development for principals as they learned what to look for in mathematics and science instruction.

The protocols for the tool need to be research-based, focusing on capturing elements of instruction that are linked to student achievement and teacher expectations. To ensure relevance, we aligned protocols to the state content standards in Florida, where the PD3 tool was to be used initially. The PD3 tool captures both the nature of instruction and the content standard covered for each observation—allowing principals to see *what* and *how* material was covered.

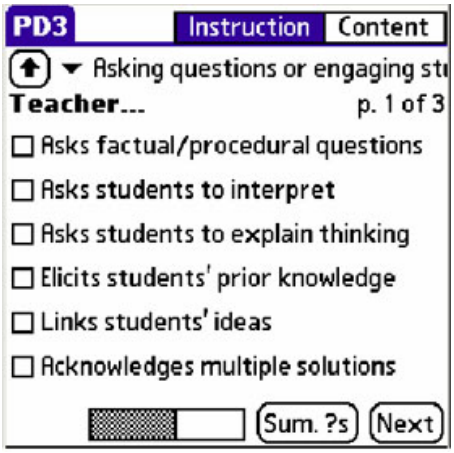

Figure 1. A screen shot of the handheld PD3 classroom walkthrough tool showing instructional strategies related to asking questions. The strategies are grouped under types of activities commonly observed, and strategies are linked to content.

Getting Started

The PD3 Web application supports an extended process of inquiry about data collected from the walkthrough tool. Instructional leaders or school improvement teams begin by selecting a question that data collected with the protocols can answer, such as: “What percentage of observations involve students engaged in tasks with a high level of conceptual complexity?” Users then formulate specific hypotheses or predictions about what they will see, specify an approach to collecting data systematically from a variety of classrooms, and conduct walkthroughs. Once data have been collected, the handheld device can be synched with a computer. The PD3 Web interface supports viewing data for a single school and allows users to make comparisons (*e.g.*, my school versus similar schools in my district also using the PD3). Data about school visits are visible only to the school improvement team, but the principal may choose to make aggregate, nonidentifiable data available to the district.

Analyzing the Data

We developed data charts to represent the observations (see Figure 2 below). A challenge for principals is collecting enough data from which to draw valid conclusions. With fewer visits, there may be much more uncertainty and variability in the data. We chose to represent these data with “box-and-whisker” plots, which allow users to see both the range of the data and where the majority of observations lie. The box-and-whisker plot below shows the median rating for observations, represented with a solid line, as well as the boundaries of the second and third quartiles, represented by the box, and most of the range of observations, represented by the whiskers. When comparing two box-and-whisker plots drawn side by side, it is easy to see when two distributions of observations are different and when they are the same.

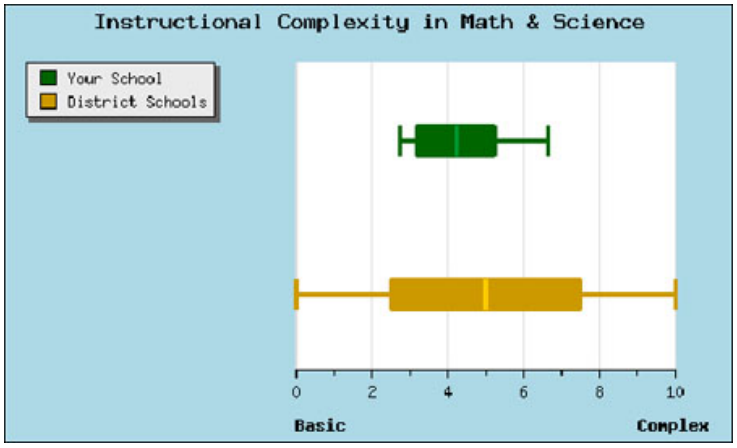

Figure 2. Box plots showing the distribution of instructional complexity at one school (top green plot) compared with aggregate data from all schools in the district that reported data (bottom yellow plot). The plot shows that the median score was lower than the median score for the district, but that the spread from lowest to highest score was not as great.

The team at SRI and the Miami Museum of Science collaborated to provide training to hundreds of school leaders across the state of Florida. The training provided leaders with practice in using the PD3 handheld software and Web interface, and it helped them learn how to read and interpret box-and-whisker plots and to use the tool as part of school improvement planning. In addition, staff at the Miami Museum of Science introduced the tool as part of its summer institute for teachers. At this institute, master teachers used the walkthrough tool to observe new teachers at the institute leading science inquiry activities. Afterward, they gave feedback to the new teachers on what they saw. The new and master teachers alike commented that the tool was a great conversation starter for how to improve practice. SRI and museum staff have also developed and tested new versions of the tool for instructional

specialists in reading and for researchers to use to make observations of a preschool science curriculum.

Enhancing Student Learning Through PD3 Walkthrough Tools

It is important to note that there is little evidence from systematic research studies that classroom walkthroughs *directly* impact student learning. Studies may yield such evidence in the future, but it may be that walkthroughs have more of an *indirect* impact on learning. Walkthrough tools can be integral to data-driven decision-making about instructional strategies and curricula—a fundamental part of contemporary accountability-based reform initiatives.

School leaders rarely have more than their hunches, intuitions, and beliefs to go on as they develop explanations for why test scores went up, down, or stayed the same. Data on the content teachers teach and the pedagogical strategies they use fill a crucial gap in contemporary accountability systems. Ironically, few such systems include data on one of the most critical inputs to student learning, the quality of instruction. Data on instruction can help to answer the questions: "If our scores went up in one area, did our instruction also change? And if so, how?" Walkthroughs provide concrete and powerful data on instruction that principals can use to make decisions on how to improve schools. Therefore, if instructional leaders are able to collect data systematically in a variety of classroom settings and times, walkthroughs have the potential to enhance greatly the information available for making good decisions about the changes most needed to improve student learning.

Resources

Austin Independent School District. *Principles of Learning: 2001-2002 Evaluation Report*. Austin, Texas: Office of Program Evaluation, Austin Independent School District, 2002.

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Goldman, P., *et al*. *Learningwalk Sourcebook*. Pittsburgh: Institute for Learning, Learning Research & Development Center, University of Pittsburgh, 2004.

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On the Same Page

Here are suggested questions that principals and teachers can use to spark discussion about how to apply the points made in this article to their particular schools.

1. What are the benefits of using handheld computer technologies to conduct classroom walkthroughs?

2. What should we be cautious of regarding the use of handheld technologies to conduct classroom walkthroughs?

3. What are some of the elements we can agree on as being important to look for during classroom walkthroughs?

4. To what degree would the use of handheld technologies promote a process of inquiry?

5. How might the use of handheld technologies increase the credibility of the data collection process within our school community?

6. To what degree should handheld technologies be used to hold teachers accountable?

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