Capturing Hard-to-Capture Data

by

Kathryn E. H. Race
Evaluation Department
Teachers Academy for Mathematics and Science
3424 S. State Street
Chicago, IL 60616
www.tams.org

Presented at the Annual Meeting of the
American Evaluation Association
Washington, DC
November 2002

Capturing Hard-to-Capture Data

Kathryn E. H. Race
Evaluation Department
Teachers Academy for Mathematics and Science
Chicago, IL

The Teachers Academy for Mathematics and Science offers an intensive professional development program for under-prepared elementary school teachers in Chicago and select school districts. Directed toward high-risk schools, an integral part of the program involves instructional sessions and classroom implementation visits conducted across time. The implementation component of the program presents the largest challenge to capture and document program relevant data. It is the purpose of this paper to outline the protocol used to systematically gather data obtained from this program component, which involves a standardized form and process, and is backed by organizational support from senior management and program staff. To illustrate how the collected data are used, the degree to which program components align with state learning standards in mathematics and science is assessed. Through this example as a whole, the potential applicability to other educational and evaluation efforts in the field is underscored.

The Teachers Academy for Mathematics and Science offers an intensive, professional development program for under-prepared elementary school teachers in Chicago and select school districts in Illinois (Brett, 1996). The program is directed toward high-risk schools, where the proportion of students that are not making grade-level standard in mathematics as well as science is high and evident across grades. The program, which will be described in more detail shortly, has two cornerstone features. The first is that the instruction and learning activities of the program are spread over time, a key characteristic of a high-quality professional development program in mathematics and science as posited by Kaser and Bourexis (1999). The second is the coaching and reflective instructional support for participating teachers. It is this component of the program, which presents the largest challenge in capturing and documenting data.

After brief background information on the program, it is the purpose of this paper to outline the protocol used to systematically gather data obtained from the classroom visit portion of the program and through this example highlight its potential applicability to other educational and evaluation efforts in the field.

Background

Founded in 1990, the Teachers Academy for Mathematics and Science, a non-profit organization, "is an autonomous alliance of leaders from education, government, science, mathematics, business, and the community" located in Chicago (Teachers Academy for

Mathematics and Science, 1998, p. 4). The program offered by the Teachers Academy is a 3-year professional development program in mathematics and science for elementary school teachers. The program content is offered by instructional level (i.e., primary, intermediate and upper grade levels) that blends mathematics and science curricula with technology. The program is designed to provide 60 hours of professional development instruction per year for two years that is developmentally appropriate by grade-level, based on national and state standards in mathematics and science, content driven and inquiry-based using nationally recognized curricula. The program is also supported by a compilation of teaching materials, classroom manipulatives to aid student learning, and technology resources.

An integral part of the Academy's program is a series of classroom visits (referred to as implementation support), which involve coaching and reflective instructional interaction between teachers and professional development staff. These sessions help to provide the teacher with an opportunity to try out their new knowledge and skills while receiving timely support and feedback from staff who are familiar with the underlying program content and pedagogy associated with these lessons (Kaser & Bourexis, 1999). More specifically, 15 contacts (described later) are planned per year during the first two years. The purpose of these visits is to facilitate the transfer of program content and pedagogy by the teacher to the classroom through modeled lessons by professional development staff, co-taught lessons, and observed lessons. As explained elsewhere (Race, Ho & Bower, 2002), this implementation support offered through the Academy program differs in at least one important feature from the *clinical teaching experiences* that are reported in the literature. The latter approach involves observing and providing feedback to teachers who are attempting new methods in an environment away from the classroom where they typically teach. Assessment of these clinical teaching experiences suggest, however, that these teachers have had difficulty applying these newly learned practices once back at their home schools (Miech, Nave & Mosteller, 2001). In contrast, the Academy's program component offers this support during visits conducted *in the actual classroom where the teachers typically teach* with reflective discussion and planning conferences happening before and/or after these visits. Also, during the course of these visits it is intended that this implementation support move from a high level of intervention in the classroom by professional development staff (by modeling a lesson(s) or co-teaching) to less involvement by professional development staff based on observation-only classroom visits. Thus, the potential for transfer of modeled lessons, best practices and the use of a variety of instructional strategies from the program instruction to classroom teaching theoretically should be greater using this model.

The overall Academy program occurs within the context of a school-wide systemic effort that requires that a high percent of mathematics and science teachers within each school participate in the program and includes program outreach to principals and school administrators as well as parents and community members. The third year provides a year of transition to help the school sustain progress after the program.

Data Collection Challenges

As part of its evaluation outcomes effort, the Academy has identified two intermediate program outcomes that focus on teacher instructional practices. These are: (1) teachers use best practices in their instruction of mathematics, science, and integrated technology; and, (2) teachers demonstrate increased ability to apply national and state mathematics, science, and technology standards to their teaching.

To meet these outcomes needs, information from the implementation component of the program is critical. The challenges of capturing data from this program component, however, are at least three-fold. First, there is a series of contacts (a combined classroom visit and conference with the teacher either before and/or after the lesson). Second, in any given school year, there are a large number of participating teachers (e.g., usually between 200-300 teachers depending on cohort). Third, there are a large number of individual staff members in the field providing this support (again, in a given school year there is anywhere from 10 to 15 professional development staff). Thus, the sheer volume (of visits, teachers, and staff) would suggest the need for standardization of information as well as the need for a routine, clearly defined protocol that articulates the data gathering process used to collect this information. Moreover, the staff time and resource demands in fulfilling this responsibility would also suggest a methodology that is easy to use. Accountability issues would suggest that the process be timely. And, program requirements would suggest that the gathered information strike a balance between the individual needs of the teachers and the overall structural goals of the program.

Purpose

The purpose of this paper is to highlight the process used to collect information gleaned from these implementation support sessions including the standardized form that was created; the electronic platform used to support these data; the inclusion of operational definitions to facilitate standard use of terms; highlight the process schedule put in place to facilitate the routine processing of these data; as well as describe the infrastructure needed from program staff and senior management to support such efforts.

Overview of Implementation Support

By design, 15 contacts per year associated with the implementation support component of the program are planned. One contact is counted as a classroom visit, or a conference held with the teacher, which occurs either before and/or after the classroom lesson. These events are paired together (except for the first session which tends to involve either a classroom visit or a conference but usually not both) and are described in one implementation log. The conference allows for the teacher and professional development staff to reflect and discuss classroom activities including what specifically went on during the lesson as well as discuss ways to improve future instruction and lesson attempts. In addition, in-session instruction time is set aside for teachers to plan how Academy or Academy-modified instruction can be incorporated in their classrooms.

If a teacher receives all planned implementation sessions, this would result in a total of either seven completed logs for that teacher; or eight completed logs if the first visit is an introductory or get-acquainted session per program year.

Implementation Log

The implementation log is the form used to capture and summarize information from the coaching and mentoring sessions of the program. This standardized form has been designed specifically for this purpose and consists of a series of closed- and open-ended questions. A reduced facsimile of this form is shown in Table 1, which if printed as a paper copy is in a 3-page format. The form asks for relevant information about the teacher including school name and region/district, grade level (these fields are auto-filled). This is followed by a query related to a pre-lesson conference including whether such a conference occurred, mode in which the conference occurred (i.e., face-to-face in school, telephone, email, face-to-face during an Academy instructional session), and the duration of the meeting. An opportunity to capture comments and other relevant information about what was discussed during the conference is provided as well.

The form focuses on information pertinent to the classroom lesson. A series of closed-end questions include: determining who took the teaching lead (i.e., the lesson was modeled by the Academy professional development staff member; co-taught by this staff member and the teacher, or the teacher taught the lesson and the staff member observed the lesson). If a lesson was co-taught, the staff member is asked to indicate whether there was shared leadership during the lesson or whether the teacher or staff member took the lead while the other served a supportive role.

Also queried is the content area covered in the lesson. A list of over 40 keywords is contained in a dropped down box on the form. (See Table 2.) This list is based on a review of the curriculum covered during the Academy instructional sessions as identified by program staff. This keyword list helps us catalogue the content areas covered during these classroom lessons, and represents a recent modification to the form. In addition, space for an open-ended description of the lesson is provided, as well as space to describe the objectives of the lesson, the activities, and primary instructional strategy used to support the lesson. Although there is considerable flexibility in the various lessons that may be part of the implementation part of the program, overaching this flexibility is a general plan to cover a designated mix of mathematics and science lessons.

The origin of the lesson and the materials used are also queried as well as whether the classroom lesson came from a lesson covered in the instructional sessions of the Academy program, whether the lesson had been planned during an instructional session of the Academy program, whether the lesson had been modified, and whether technology was used during the lesson.

Considerable attention is given to identifying which of the Illinois state mathematics and science learning standards are covered during the lesson in question. A brief summary of the Illinois mathematics and science learning standards are shown in Table 3. Multiple

Table 1
2001-2002 Implementation Log

Teachers Academy for Mathematics and Science

2001 - 2002 Implementation Log

Teacher Dropped ☐ YES ☐ NO   Date Dropped

Teacher   Log #   Date Modified

PD Phone#   PD Name   Team   Record #

Teacher ID# (6 Digit)   Teacher (First, Last)   Log # (use 0 for initial visit)

PROBLEM ☐ YES   School   Cluster   Region

Students Home Room (will autofill but should be verified at time of implementation):   Administrator ☐ Other ☐

Instructional Level: P ☐ K ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ Special Ed ☐ Bilingual ☐ LRC /Library ☐

Prelesson conference occur? Yes ☐ No ☐   Prelesson conference time (in minutes)

Preconference method: Face-to-face in school ☐ Telephone ☐ E-mail ☐ Face-to-face at TAMS session ☐ Other ☐

Preconference comments:

Implementation visit occur? Yes ☐ No ☐   If no, reason for visit not being completed?

If no, was visit Yes ☐ No ☐

If yes, visit date?

Implementation visit time (in minutes)

Did the lesson come from the Academy? Yes ☐ No ☐

Was the lesson modified? Yes ☐ No ☐

Lesson planned during PD sessions? Yes ☐ No ☐

Did lesson involve use of technology? Yes ☐ No ☐

State mathematics standards addressed:
- 6: Number sense ☐
- 7: Estimation and measurement ☐
- 8: Algebraic and analytical methods ☐
- 9: Geometric methods ☐
- 10: Data analysis / probability ☐
- Math was not standards based ☐

PD/ Teacher Role:
- PD Observed / Teacher taught lesson ☐
- PD Modeled lesson ☐
- Co-Taught lesson with shared leadership ☐
- Co-Taught lesson with PD taking lead ☐
- Co-Taught lesson with Teacher taking lead ☐

Origin of materials used in lesson?
- Received from Academy ☐
- Brought from Academy ☐
- Obtained elsewhere / other ☐

State science standards addressed:
- 11: Inquiry and Design ☐
- 12: Concepts and Principles ☐
- 13: Science, technology and society ☐
- Science was not standards based ☐

Content Topic Keyword:

Content Topic Implemented: describe the content area(s) implemented during lesson if needed or helpful.

Objective: describe the objectives of the lesson:

Teachers Academy for Mathematics and Science   2

2001 - 2002 Implementation Log

Teacher Dropped ☐ YES ☐ NO   Date Dropped

Teacher   Log #   Date Modified

Lesson / Activity: briefly describe the lesson activity and specify the primary instructional strategy used. If the lesson was modified from an Academy lesson, describe how lesson was changed. Also provide a brief description of the materials and technology used.

Instructional Strategies Used (Click all that apply)

BEST PRACTICES
- Addressing a variety of learning styles ☐
- Assessment / feedback ☐
- Constructivism ☐
- Cooperative learning ☐
- Hands-on / minds-on approach ☐
- Higher order thinking skills ☐
- Interdisciplinary connections ☐
- Real-world connections ☐
- Student directed ☐
- No best practices used ☐

LESSON FORMAT
- Activity ☐
- Discussion ☐
- Experiment / investigation ☐
- Games/contest ☐
- Group work ☐
- Reviewing ☐
- Seat work (independent /uniform) ☐
- Student presentations ☐
- Teacher directed ☐
- Teacher lecture / demonstration ☐
- Work at computer ☐
- Other ☐

Professional Developers Reflections: describe your interpretation of the lesson, whether efforts reflect good examples of content application, pedagogy, correct use of materials, classroom management, etc.

Teachers Academy for Mathematics and Science   3

2001 - 2002 Implementation Log

Teacher Dropped ☐ YES ☐ NO   Date Dropped

Teacher   Log #   Date Modified

Did a postlesson conference occur as originally planned? Yes ☐ No ☐   Postlesson conference date: Postlesson conference time (in minutes):

Postconference method: Face-to-face in school ☐ Telephone ☐ E-mail ☐ Face-to-face at TAMS session ☐ Other ☐

Postlesson conference comments

Teachers Reflections: provide a narrative of the teacher's observations, perceptions, and reflective assessments. Clearly state what you think these are from the teacher's perspective, even if you do not necessarily agree with these observations. Ask the teachers to reflect on how many times the teacher has used TAMS activities since the last conference.

PD's Reflection on Teacher's Progress (outcomes): reflect on the teacher's progress in relation to your team's learning objectives and/or short-term outcomes.

Next steps for implementation: identify what are the next steps for follow-up on the implementation visit and conferences?

Total time:

Table 2
List of Content Topic Keywords

Content Area	Content Area	Content Area
Algebra/Algebraic Reasoning	Graphing	Routines
Assessment	Living Organisms	Science Practices
Attributes	Magnets	Scientific Inquiry
Calculator	Matter and Energy	Science, Technology, Society
Change	Measurements	Simple Machines
Constructivism	Minerals	Soils
Data Analysis	Multiple Intelligence	Solid Geometry
Density	Number Sense	Spacial Relations
Earth Features and Processes	Observation	Spacial Visualization
Environmental Interaction	Operations	Structure of the Universe
Estimation	Patterns	Technology
Force and Motion	Physical Science	Technological Design
Inquiry	Probability	Volume
Geometry	Problem Solving	Other

Note. This keyword list was compiled by program staff.

answers are expected such that all learning standards covered in the lesson are identified. Illinois mathematics learning standards run parallel to national mathematics standards proffered by the National Council of Teachers of Mathematics (NCTM, 2000). On the other hand, Illinois science learning standards are quite a bit more general than the national science education standards put forth by the National Research Council (1996).

Also queried is the use of best practices during the lesson, which are listed in Table 4 along with a brief operation definition of each term. Again, professional development staff are encouraged to select all best practices that are observed during a specific lesson. If no best practices are observed during the lesson, there is a place to indicate this as well. In a similar manner, a list of instructional strategies is provided on the form. These are listed in Table 5 along with a brief operational definition for each. These definitions were derived from a variety of sources (e.g., Fogarty, 1993, 1999; Forgarty & Bellanea, 1992; American Heritage Dictionary, Education Week on the Web (August, 1999) and are intended to reflect state-of-the-art thinking on the usage of these words. In addition, there is space provided for the professional development staff member to reflect on the lesson, and to indicate whether the observed efforts reflect good examples of content application, pedagogy, correct use of materials as well as other issues, such as classroom management.

The remainder of the form addresses whether or not a post-lesson conference occurred and if so, what was discussed. This conference may not occur on the same day as the lesson but through various modes (as may be used to conduct the pre-conference) it is

Table 3
State Mathematics and Science Standards Addressed during Observed Lesson

State Learning Standards: Mathematics	**Description**
Math State Goal 6: Number sense	Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.
Math State Goal 7: Estimation and measurement	Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.
Math State Goal 8: Algebraic and analytical methods	Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems, and predict results.
Math State Goal 9: Geometric methods	Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.
Math State Goal 10: Data analysis/probability	Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.
State Learning Standards: Science	
Science State Goal 11: Inquiry and design	Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.
Science State Goal 12: Concepts and principles	Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.
Science State Goal 13: Science, technology and society	Understand the relationships among science, technology and society in historical and contemporary contexts.

Note. Consult the Illinois Learning Standards Adopted July 1997 by the Illinois State Board of Education if further reference is needed. http://www.isbe.state.il.us/ils/lstandards.html

designed to occur in time proximity to the lesson. Nevertheless, the information captured in large part pertains to the lesson that has just been described. The professional development staff member first is asked to describe the teacher's perceptions, observations, and reflective assessments related to this lesson; and, is encouraged to describe what he or she thinks the teacher's perceptions are, even if they do not agree with these or if they have a different perspective. Also explored, is whether the teacher has used Academy activities or lessons since the last conference. This is one of the few opportunities for professional staff members to obtain information about lessons that they were not a direct part of or had observed.

The professional development staff member also is asked to provide his or her own reflections on the lesson as well as the individual teacher's progress in the program relative to the program's learning objectives and short-term outcomes. Finally, a section is provided to describe what the next steps for implementation support are, as well as

Table 4
Identified Best Practices and Operational Definitions

Best Practice	Definition
Addressing a variety of learning styles	Uses several different approaches to instruction to help engage students.
Assessment/feed-back	Evidence of teacher use of assessment and student feedback involving portfolios, tests and assessments, worksheets, feedback on homework assignments, journal entries and use of student self-reflections. Examples include: an exercise, such as a written test, portfolio, or an experiment, that seeks to measure a student's skills or knowledge in a subject area.
Constructivism	Emphasis placed on student(s); students interact with objects and events, constructs his/her own conceptualizations and solutions to problems; student autonomy and initiative is encouraged.
Cooperative learning	Small group learning activities in which students interact with each other more than the teacher and depend on each other to learn something or complete a task.
Hands-on/minds-on approach	Use of concrete, hands-on materials; physical objects such as pattern blocks, tiles of various geometric shapes, rulers, and balances.
Higher-order thinking skills	Students explain how what they learned in class relates to the real world; put events or things in order and explain why they are organized that way; work on problems for which there are several appropriate methods of solution; work on project, gathering data, conducting an experiment, work on problems for which there is no obvious method of solution; and apply concepts or principles to different or unfamiliar situations, synthesize information from multiple sources, communicate effectively both orally and in writing.
Interdisciplinary connections	Content of lesson involves more than one discipline, for example math and science, math and music with focus on explicit connections across subject areas and interdisciplinary topics rearranged around overlapping concepts, emergent patterns and designs.
Real-world connections	Integrates examples from the real world or every day life into subject areas studied and/or projects being prepared. Explicit connections are made from a theme or lesson and focus to authentic learning projects and episodes.
Student directed	Students explain how class relates to real world; self-evaluate and improve their own work, students confer with other students about their work, solve problems that have several methods of solution, evidence of student self-reflection/goal setting, work individually or with group on project(s) or presentation(s).
No best practices	Check if there was no evidence of any best practices used during the lesson.

what may be planned (e.g., content, pedagogy) for the next lesson. The total time spent with this teacher related to the lesson and conference(s) is recorded as well.

In the event of a cancelled visit, this cancellation is also documented in the implementation log. Professional development staff members are asked to provide a brief explanation of the reason for the cancellation, and whether the visit has been

Table 5
Identified Lesson Formats and Operational Definitions

Lesson Format	**Definition**
Activity	A specified form of supervised action other than a game or contest.
Discussion	An earnest conversation by a group about a given subject area or area(s).
Experiment/ Investigation	A test made to examine the validity of a hypothesis; to make a detailed inquiry or systematic examination.
Games/contests	A means of amusement; a set of rules completely specifying a competition; a competition that involves rivalry, judging performance, and often a declared "winner."
Group work	Teacher(s) work with small groups of students, teacher(s) work with individual students; students work individually on projects or presentations; students confer with other students about their work, students work as part of a group on projects or presentations, and/or students discuss with whole class solutions developed in small groups.
Reviewing	The process of studying, looking over or examining again.
Seat work	Students work at their own desk either working on different exercises or projects or all are working on the same exercise.
Student presentations	Work or project that is student directed; student(s) impart information to other students and/or teacher.
Teacher directed	Instruction that is lead by teacher.
Teacher lecture/ demo	Traditional standup teaching in which interaction is a one-way broadcast, punctuated with occasional rhetorical questioning.
Work at computer	For example, use of Internet, computer-generated lesson, use computers to create tables, graphs, and/or charts, or other activities.
Other	Specify briefly as needed.

rescheduled. Patterns of missed visits for a particular teacher are discussed by professional development and supervisory staff as needed.

Procedure

All of the information described thus far, and the process schedule shown in Table 6, is available to the professional development staff member in electronic format. This electronic database was created by the technology staff of the Academy during the 1999-2000 school year. The form and database are housed in FileMaker Pro (FileMaker, 1999). In support of this system, each professional development staff member has a laptop computer, in which his or her individualized database is stored, accessed, and where data are exported. It is to these individual databases that implementation logs are written and saved. Although the time to complete a log varies, based on conversations with program staff we estimate that it can take between 30 to 45 minutes to finish a log.

According to the recommended schedule, twice a month each professional development staff member submits a copy of his or her database to a designated Academy email address. These data are then fed into an Academy-wide implementation log database. This database houses the completed implementation logs compiled during a given school year for all teachers receiving implementation. During the school year, the growth of this database is dynamic, it is periodically updated every time a professional development staff member submits a set of logs. At the end of the school year, the file becomes an archive of information on the implementation support offered during that time period.

As is similar with other databases, routine data reports can be conducted to answer operationally-related questions. For program outcome related analysis purposes, however, quantitative data are exported from FileMaker Pro to SPSS (2002).

Organizational Support

Clearly a process that requires this level of involvement also requires a solid commitment from the organization sponsoring it. Such a commitment must start with senior management. It is important to acknowledge that such a sustained effort in the field would have little or no promise of getting off the ground without the philosophical belief and support by senior management and program staff of its fundamental importance. This acknowledgement notwithstanding it is not necessarily a done deal that the support to document such an effort would automatically follow. Without it, however, there is little hope of success. Moreover, not only is buy-in from program staff critical but the quality of the effort is likely to be enhanced if the core content of what is documented parallels the information needs of the program staff who collect it.

The time and resources needed for the development and rollout of such an effort should not be underestimated. Although the reduced cost and accessibility of personal computers have increased the feasibility, there is still resources needed to cover the costs associated with an effort that requires the inherit support of technology. The need to allocate time for program staff to complete this documentation process needs to be recognized as well as in particular positioning this task as an integral part of program staff responsibilities. Also, if feasible, having a designated staff member serve as the point person or project champion can help to sustain the effort and serve as a means to

Table 6
Implementation Log Procedure

After careful review of using the web as a method of entering and reviewing implementation data, we needed to look for an alternative solution. By utilizing a database management application that is not dependent on a connection to the Internet, each professional developer can be in control of their own data, view it in a format that is best for them and search and sort by different methods. Records can be created and entered not connected to the web and then forwarded to the Academy on a regular basis (prefer **at least twice per month** but your Team Leader may provide you with other instructions).

Important Considerations

- Each desktop or laptop that a professional developer or team leader will be working with will be loaded with FileMaker Pro 5.0 (contact the Help Desk if it still needs to be loaded after today).

- Each professional developer will receive a copy of a database that includes all of their records that have been entered from scantron and the narrative forms. Generally, if you submitted your narrative forms digitally (sent to us the implementation log files that you created in MS Word), we have the full log entered into the database. If you used the electronic template but did not send to us the electronic version, the narrative information has not been entered into the database (we will go through the procedure for copying and pasting your data).

- After September 19, 2001 any PD that does not have access to the software required for the new log procedure or has problems with using the database should contact Teresa and/or Evelyn/Mindy so that we can make sure your implementation log information is included in the database. There are options to overcome problems that include:
  - continued use of the scantrons and narrative form;
  - asking a support person to help with data entry;
  - doing all of the data entry here at the office once per month.

Data Entry Procedure

1. During implementation/instructional support sessions, there is information that needs to be documented. Each PD may choose to handle the documentation process differently. You may use the template and write the information on the pages while working with a teacher or you may directly enter the information into your database on your laptop during the session or during “down time” at the school.

2. Create a new record by clicking the new record button or pulling down the mode menu and selecting New Record for each implementation/instructional support session. Pre and post session information can be recorded on the same log record.

3. A blank record will appear and the fields that are “boxed” will require data entry. Create a record number that is unique for your database. The autofill has been set to begin with 1 and then add 1 each time a new record is created. Do not be concerned if the record numbers are not in order or numbers are skipped (after deleting records that wrong). The important part is that it is a unique number.

4. Some fields are set to autofill:
   - Date Modified will change when data is altered on the record.
   - The Record Number field will autofill with the next sequence starting with 1.
   - Once the PD’s phone number is entered and the tab button pressed, the PD’s name should appear.
   - Once the Teacher’s 6 digit ID # is entered, their name, school, and cluster should appear.

Table 6

Implementation Log Procedure (continued)

Data Entry Procedure (continued)

5. Some fields are pop up menus that you can use the mouse or the directional arrow on the keyboard to scroll through. Other fields you will have to use the mouse to click in the appropriate box to select. If you click on a check box by mistake, click again and the X will disappear.

6. Move through the record by pressing the Tab key or by using the mouse and clicking in the appropriate fields. You can also use the scroll bar on the side to move to different sections of the data entry form.

7. Move through the records to past sessions by any one of these options:
   - Click on the Flipbook's pages to move forward or backward in your records [pg. 36];
   - Click and drag the Flipbook's bookmark to move within the sequence [pg. 36];
   - Select a different Form (instead of Data entry or Simple Data Entry) [pg. 35];
   - Pull down the Mode menu and choose Find (see specific directions for Find) [pg. 42].

8. Look at your records from different Form Views by clicking on the button above the Flipbook, labeled Data Entry or the name of the current view, and selecting a different option such as listing.

9. Copy and paste field data from other records (or documents) by using the standard copy and paste procedures.

10. Refer to the previous implementation log procedure for field entry information (attached to this procedure).

Submitting Records to the Academy to Merge with the Complete Database.

1. On a regular basis (recommended at least twice per month) you will need to send us your database.

2. Attach the file to an e-mail message and send to Implog Coordinator at implog@tams.iit.edu. In GroupWise, click on the Attach button. Find the file on your hard drive (implog02XX.fp5) and click Add.

3. Each time you submit your database, we will be making a back-up copy of the file sent. We will find all of the records that are currently in the database, and replace them with the new file. The exception would be if you advise within the e-mail that they are specific records. I suggest that you always submit your whole database each time.

4. Each time we receive your files, we will merge them with the complete database and send a message to your team leader. They will review the records and then if there are any recommended changes or follow-up you may make on your database and then send to us during the next submission. The revised records will replace the old ones.

5. Cumulative reports from the submitted implementation logs will be distributed monthly to team leaders. Copies will be available from them if needed.

Effective September 25, 2001

Note. The technology staff of the Academy prepared these procedural instructions.

coach the coaches. Finally, there is benefit from rolling-out such an effort in steps, and if possible, in a systematic pilot test of the process, nature of the data collected, and applications of its usage.

Example of Data Use

It is beyond the scope of this work to provide examples of all of the various ways in which the information from the implementation log can be used. Nevertheless, an illustrative example can provide insights as to how this information can be applied to support program design and modification decisions.

One of the tenets of the Academy's program is that the instructional session curriculum aligns with national and state learning standards in mathematics and science. How the instructional program stacks up against the Illinois learning standards in mathematics and science is shown in Figures 1 and 2. For the instructional program, these proportions are based on the number of program hours that cover a particular standard. Some lessons are designed to address both state mathematics and science standards; if so, each applicable standard is noted in each discipline. (It should be recognized that program staff compiled these instructional program data.) How the instructional and implementation portions of the program stacks up against each other relative to state learning mathematics and science standards is also shown in Figures 1 and 2. For the implementation portion of the program, the number of sessions where a mathematics or science standard was observed was divided by the total number of observations. These later data came directly from the implementation logs (Lanum, Race & Ho, 2001).

On the surface, such data demonstrate to our program participants, stakeholders and funders that the instructional and implementation portion of our program is standards-based, as we state that it is. It also shows that this alignment differs based on the instructional level of the program as might be expected. It should be noted that a benchmark as to the ideal apportionment of content specific standards across grade levels has not been delineated for either mathematics or science (NCTM, 2000; National Research Council, 1996). Such program information, however, helps us wrestle with the idea that some variability between the instructional and implementation portion of the program based on content area alignment with state learning standards should be expected. The larger question is how much variability can there be (or should there be) and still be within the expected parameters suggested by the instructional program. These data, along with a series of goodness-of-fit tests, suggest that the content covered in implementation portion of the program is standards-based, but the content aligns differently (that is, statistically) from what might be expected from the instructional portion of the program. Such data allow us to explore questions of modifications to both sides of these proportions, that is, to the instructional program as well as to the content emphasized in implementation.

Other analyses using data from the implementation log have shown that the level of intervention by the professional development staff members changes over the duration of this program component. That is, as planned, there is a shift over time from lessons that

Figure 1

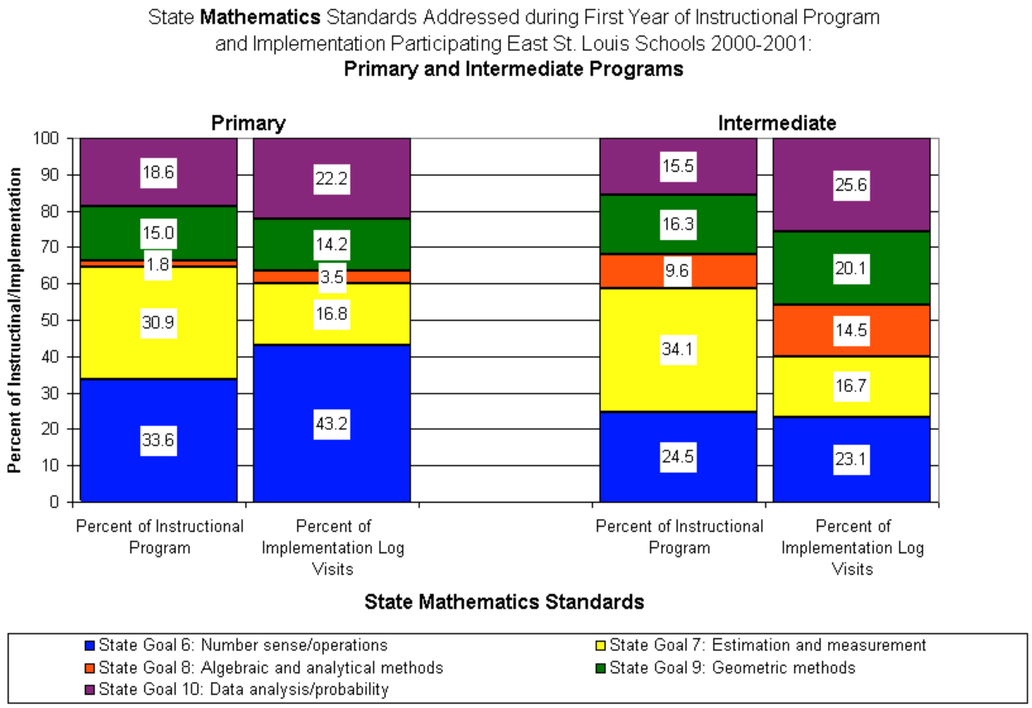
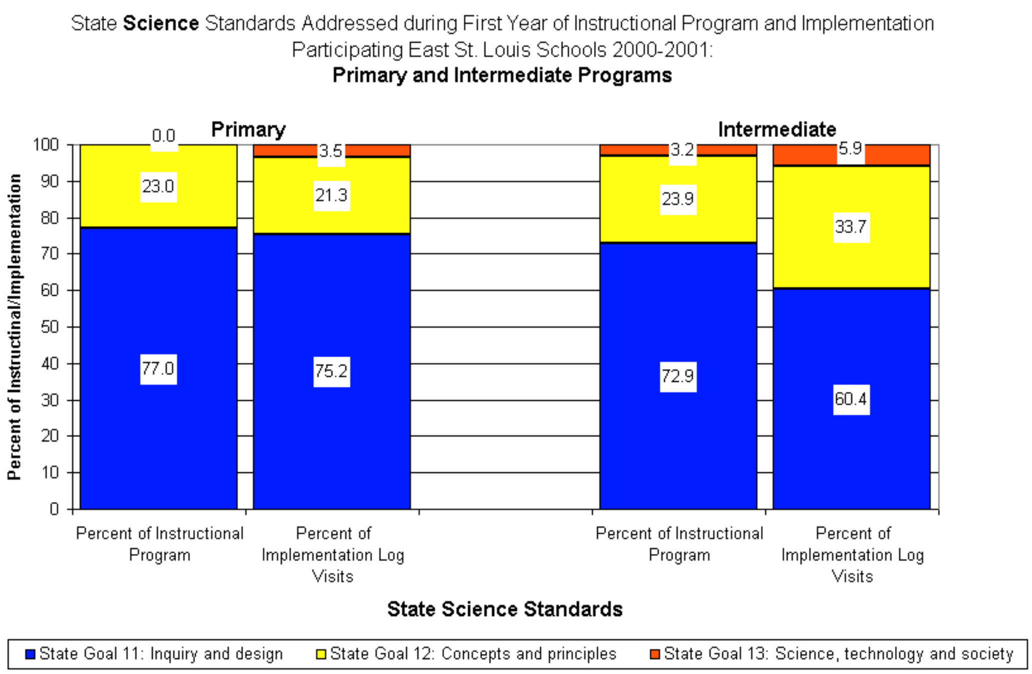


Figure 2



tend to be modeled by the professional development staff member, to co-taught lessons, and subsequently to teacher taught lessons. Importantly, however, these data often show that this pattern varies across school regions or districts and/or by instructional level according to the individual needs of participating teachers. Different patterns of the use of best practices as well as instructional strategies by participating teachers across school cohorts and instructional levels have been described as well (Lanum, Race & Ho, 2001).

Conclusions

There are many reasons why documenting this integral program component is important. Among these are that the information can help respond to accountability questions likely to surface with so many staff, and so much of their time, in the field. The ability to document the level of effort executed can provide valuable information on the level of intervention attained across participants as well as help justify what the needed level of effort might be in future efforts. Such information can help in financial decisions to justify expenditures as well as guide future budget considerations. The obtained information itself can be reviewed to modify or improve the data collection process. In addition, this information can be used in formative program assessment to better explain program component elements, identify program strengths and weaknesses, as well as suggest ways to improve the program and program activities. At the individual teacher level, the information can serve as a structured-diary, helping both the professional development staff member and participating teacher keep track of the progress made and help guide future teacher and lesson plans. At the school level, review of this information can help foster the development of grade-level meetings or other collaborative efforts among teachers within a given school or across schools within the same district or proximal area. And these data have been helpful in our assessment of program outcomes relative to changes in level of intervention, standards-based content alignment, and the use of best practices and varied instructional strategies.

Ultimately, this experience can be generalized or adapted to other program activities or similar programs in the field. Fundamental to the effort, however, is identifying the key questions to ask and what data are needed to help answer these questions. Determining the desired level of information, such as breath or depth, and attaining a balance between closed and open-ended questions are helpful as well. Understanding the benefits and need to standardize the information collected is paramount as well as supporting a process that facilitates the collection of information in a systematic way. The availability of computer technology can provide the vehicle to store these data systematically and enhance retrievability of information for routine queries as well as increase the ease of accessible for more in-depth program-related analyses. Finally, the importance of buy-in from participating program staff plus the commitment and support from senior management are integral parts of the success of the effort.

References

Brett, B. (1996). Using a template for a summarizing assessment of the Teachers Academy for Mathematics and Science. *New Directions for Evaluation, 72*, 49-79.

Kaser, J. S., & Bourexis, P. S. (1999). *Enhancing program quality in science and mathematics*. Thousand Oaks, CA: Corwin.

Lanum, M., Race, K. E., H., & Ho, E. *Summary of results from implementation visits for participating East St. Louis and Joliet public school teachers receiving primary or intermediate professional development program instruction during the 2000-2001 school year.* Chicago: Teachers Academy for Mathematics and Science.

Miech, E., Nave, B., & Mosteller, F. Large-scale professional development for schoolteachers: Cases from Pittsburgh, New York City, and the National School Reform faculty. *New Directions for Evaluation*, 90, 83-99.

Teachers Academy for Mathematics and Science. (1998, June). *Strategic plan 1998-2003*. Chicago: Author.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* Reston, VA: Author.

National Research Council. (1996). *National science education standards.* Washington, DC: National Academy.

Race, K. E. H., Ho, E., & Bower, L. (2002, April). *Documenting in-classroom support and coaching activities of a professional development program directed toward school-wide change: An integral part of an organization's evaluation efforts.* Paper presented at the annual meeting of the American Educational Research Association. New Orleans, LA.