DORA-II Technical Adequacy Brief:

Measuring the Process and Outcomes of Team Problem Solving

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Abstract

School teams regularly meet to review academic and social problems of individual students, groups of students, or their school in general. While the need for problem solving and recommendations for how to do it are widely documented, there is very limited evidence reflecting the extent to which teams effectively engage in a systematic or effective process at these meetings or the extent to which engaging in recommended processes results in positive outcomes. One reason there has not been more progress on understanding team-based problem solving is the absence of research tools for studying the process and its outcomes. In previous research, we developed the Decision Observation, Recording, and Analysis (DORA), documented its technical adequacy for assessing the behavior of teams during their team meetings, and demonstrated its usefulness in both single-case and randomized controlled trial studies examining problem solving in schools. In this research, we expanded DORA to provide documentation that the solutions that teams develop have been implemented with fidelity and are associated with problem improvement. We found that the revised instrument was a valid and reliable tool for assessing team behavior and that it provided technically adequate information on the extent to which teams were assessing if they had implemented a solution and if the solution made a difference for students. We believe the revised DORA is a measure worthy of use in studying team-based problem solving, and we discuss our findings as a base for a well-reasoned research agenda for moving the process forward as evidence-based practice.

DORA-II Technical Adequacy Brief:

Measuring the Process and Outcomes of Team Problem Solving

The use of school teams to identify and solve educational problems is a widely recommended and accepted practice in America’s schools (Blankenship, Houston, & Cole, 2010; Boudett, City, & Murnane, 2006a,b; Boudett & Steele, 2007; Chenoweth, 2010; Coburn & Turner, 2012; Deno, 2005; Leithwood, 2010; Murnane, Boudett, & City, 2009; Steele & Boudett, 2008a,b). Driven in large measure by a conceptual framework for data-informed decision making embodied in *No Child Left Behind* (*NCLB*) and by reauthorizations of Public Law 94-142 now codified as the Individuals with Disabilities Education Improvement Act of 2004, this practice is a core feature of both general and special education (Brown-Chidsey & Steege, 2005; Boudett et al., 2006a,b; Henley, Ramsey, & Algozzine, 2009; McLeskey, Waldron, Spooner, & Algozzine, 2014; U. S. Department of Education, 2009). In fact, nearly every school in the country has teams meeting regularly to solve administrative as well as academic and social problems. The assumption is that problem solving by a group of individuals (including family members and students) acting as a team will provide better outcomes than these same individuals acting alone; and, an impressive literature exists with guidance and recommendations about the need for and the process of team problem solving (Bransford & Stein, 1993; Carroll & Johnson, 1990; D’Zurilla, Nezu, & Maydeu-Olivares, 2004; Gilbert, 1978; Huber, 1980; Jorgensen, Scheier, & Fautsko, 1981; Marsh, McCombs, & Martorell, 2010; Newton, Horner, Algozzine, Todd, & Algozzine, 2009; Tropman, 1996; Tropman & Mills, 1980; Ysseldyke et al., 2006). Important takeaways in what has been written about this practice are that (a) the cycle of steps or stages for effective problem solving remain impressively consistent across time, context, and authors; (b) simply giving teams steps for the process does not guarantee they will effectively use them; (c) current problem solving practices in schools leave much room for improvement; (d) barriers to effective problem solving are the same as those often cited as challenges to other promising practices (i.e., attitudes and a lack of time, resources, and training); and, (e) there is an impressive lack of evidence-based research on the extent to which school teams engage in recommended problem solving practices and if those practices are related to positive student outcomes. We believe one reason for this paucity of empirical evidence is the absence of well-documented data collection tools needed to assess problem solving practices by school teams.

Importance of Data in Problem Solving

Data are the currency of team problem solving and associated efforts to reform education; in fact, “using data to inform instruction,” “data-based decision making,” “data-driven decision making,” “data-informed decision making,” and “data use” are increasingly popular mantras in which policy makers and other professionals place faith in their efforts to transform practice (Coburn & Turner, 2012; Cook & Brown, 1999; Gilbert, Compton, Fuchs, & Fuchs, 2012; Goren, 2012; Halverson, Grigg, Prichett, & Thomas, 2005; Hamilton et al., 2007; Honig & Coburn, 2008; Kerr, Marsh, Ikemoto, Darilek, & Barney, 2006; Means, Padilla, & Gallagher, 2010; Moss, 2012; Shinn, 1989; Spillane, 2012; Supovitz, Foley, & Mishook, 2012; U. S. Department of Education, 2009; Wayman, Cho, Jimerson, & Spikes, 2012; Wickens, Lee, Liu, & Becker, 2004; Young & Kim, 2010). Despite the centrality of data to team problem solving, most professionals agree and recent writing suggests that simply having data is a necessary but not sufficient condition for using the information effectively, solving problems, or producing change (Choppin, 2002; Feldman & Tung, 2001; Hoover, 2009; Marsh et al., 2010; Marsh, Pane, & Hamilton, 2006; Mason, 2002; Scott, Liaupsin, Nelson, & McIntyre, 2005; Scott, McIntyre, Liaupsin, Nelson, Conroy, & Payne, 2005; Supovitz & Klein, 2003; U. S.

Department of Education, 2009; Wayman et al., 2012): “[D]ata do not objectively guide decisions on their own—people do, and to do so they select particular pieces of data to negotiate arguments about the nature of problems as well as potential solutions” (Spillane, 2012, p. 114).

There is growing evidence that administrators, teachers, and other professionals working in schools need help with selecting relevant data (Blankenship et al., 2010; Depka, 2010; Halverson et al., 2005; Scott, McIntyre, Liaupsin, Nelson, & Conroy, 2004; Spillane, 2012; U. S. Department of Education, 2009) and asking the right questions so that problem solving fits the local context (Jerald, 2005; Stringfield & Yakimowski-Srebnink, 2005; Wallace Foundation, 2013; Wickens et al., 2004): “Educational institutions are awash with data, and much of it is not used well” (Earl & Katz, 2010, p. 10). They also need training organized around an authentic task in which teams learn how to use data and available research to craft, implement, and evaluate evidence-based solutions for the problems that they identify (Coburn & Turner, 2012; Foegen, Jiban, & Deno, 2007; Gallimore, Ermeling, Saunders, & Goldenberg, 2009; Hill, 2010; Honig & Venkateswaran, 2012; Jerald, 2005; Little, 2012; Shah & Freedman, 2011). Otherwise district, school, and instructional personnel get very good at using data to talk about and document problems; and, often spend more time “admiring problems” than using what they know to *solve* problems (Jerald, 2005). While we support the use of data in efforts to improve what goes on in America’s schools and classrooms, we also believe that realizing the powerful promises in this work requires documentation and enhancement of what is known about the process and outcomes of team problem solving.

Guiding Principles

An analysis and review of extant writing revealed that in a variety of formats, team problem solving has been a recommended practice for many years (Bergan & Kratochwill, 1990;

Boudett et al., 2006b; Deno, 1985, 2005; Hamilton et al., 2009; Spillane, 2012; Tilly, 2008; U. S. Department of Education, 2009). Yet, as Little (2012) points out, “little of this writing affords a window into the actual practices [professionals] employ as they collectively examine and interpret … data or the ways in which the contexts of data use come to occupy a central or peripheral part of … ongoing work life” (p. 144). Put another way, what teams of professionals actually do under the broad banner of “problem solving” remains relatively underdeveloped, understudied, and unknown.

Our interest in the process of using data to articulate the nature of problems and produce desired change related to them (i.e., problem solving) was grounded in six guiding principles.

1. The problem-solving process is similar whether engaged by individuals or teams of professionals. At the simplest level, people engaged in problem solving collect and analyze information, identify strengths and problems, and make changes based on what the information tells them. While this is “not rocket science,” doing it well often involves the systematic focus and perspective, precision, and persistence of an engineer.
2. The problem-solving process is universally applicable and unbounded by conventions or traditions of general and special education. The need to reform practice and improve outcomes is not unique to either general or special education.
3. The problem-solving process is iterative, involving cycles of activities that are observable. The process typically involves iterative steps (e.g., collecting information from a variety of sources, transforming the information into testable hypotheses, selecting, implementing and evaluating interventions that test the hypotheses, and adapting or revising the interventions based on fidelity and impact data).

4. The problem-solving process is a practice of coordinated activities informed by the context in which it occurs and the actions represented there. The process is about change and we can only change what we can see.
5. The problem-solving process is inherently goal-oriented and incomplete until an action taken has resulted in a change in behavior. Almost anybody can identify a problem and many policy-makers and professionals are remarkably good at doing it; but, the work is complete with turning something wrong into something right.
6. The problem-solving process is defined by actions that are teachable. Giving people data does not ensure that they will actively use them to solve problems; the actions of problem solving can be and have to be carefully taught.

We were interested in documenting the quality of problem-solving processes and outcomes evidenced in the decision making of teams providing school-wide positive behavioral interventions and supports (SWPBIS) in elementary schools. We refer to the process as Team-Initiated Problem Solving (TIPS) and operationalized it with a set of actions taken during meetings of school-based teams engaged in identifying and resolving students' social and academic behavior problems (see Figure 1). Specifically, team members use TIPS to:

- Identify and define students' social and academic problems with *precision* (the what, when, where, who, and why of a problem);
- Establish an objectively-defined goal that, once achieved and maintained, signals resolution of the problem to the team's satisfaction;
- Discuss solutions and create a contextually-appropriate implementation plan to resolve the problem;

- Implement solutions with a plan for describing, monitoring, and achieving "treatment fidelity" of the actions taken;
- Monitor the problem across successive meetings to determine the extent to which implementation of solution actions with integrity resolves the problem; and,
- Revise solution actions as necessary to achieve resolution of the problem.

A key feature of TIPS is its emphasis on team members' ongoing and cyclical use of data to inform decision making about each stage of the problem-solving process. TIPS also consists of a set of "foundational" or "structural" elements that give team members a template for holding team meetings that are efficient and effective (e.g., job descriptions for important team roles, a standardized meeting minutes form).

In previous research, we developed the Decision Observation, Recording, and Analysis (DORA) tool to document activities and adult behaviors during positive behavior support team meetings and to provide a basis for documenting the relationship between teaching these teams how to systematically solve problems and achieve improvements in the quality of their school-based meetings (Newton, Horner, Todd, Algozzine, & Algozzine, 2012; Newton, Todd, Horner, Algozzine, & Algozzine, 2009; Todd, Newton, Horner, Algozzine, & Algozzine, 2009). We developed the Decision Observation, Recording, and Analysis-II (DORA-II) to refine our understanding of the problem-solving process and to expand our analyses to the outcomes of these meetings. In this research, we addressed three objectives:

1. Replicate key features of the technical adequacy of DORA by documenting the validity and reliability of DORA-II for evaluating team problem solving processes.

2. Document the technical adequacy of DORA-II for evaluating the extent to which a school team assesses the fidelity with which they have implemented an approved solution and the impact of its efforts on student outcomes.
3. Discuss the emerging research agenda that opens up given the existence of a measure that allows assessment of team-based problem solving implementation integrity and impact.

We believe using DORA-II provides support for TIPS as an evidence-based practice for teams with broad implications for improving problem-solving practices that “permeate all aspects of service delivery” in general, special, and remedial education (NASP, 2010, p. 4).

Method

Our research took place in two states. We followed widely-used procedures for documenting the technical adequacy of measurement data (i.e., scores) obtained using assessment instruments in counseling, education, psychology, and other social science areas (cf. American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999; Dimitrov, 2012; Messick, 1989, 1995; Soukakou, 2012).

Context

Over a six-month period, we observed 18 meetings in which team members discussed a total of 44 problems in 10 schools that met the following criteria: (a) enrolled elementary-aged students, (b) implemented school-wide positive behavioral interventions and supports (SWPBIS; Horner, Sugai, & Anderson, 2010) for at least one year, (c) used the School-wide Information System (SWIS: May et al., 2010) during the previous six-month period, (d) monitored SWPBIS implementation fidelity using procedures recommended by Algozzine et al., 2010) and (e) had

SWPBIS team that met at least monthly. Additionally, based on previous experience and information provided by external coaches, we selected schools with teams with a wide range of experience with the problem-solving process.

Demographic data for participating schools and PBIS Teams are in Table 1. No statistically significant differences ($p > .01$) were found between the two states with regard to school enrollment, classroom teachers (FTE), student/teacher ratio, percent student enrollment for kindergarten through fifth grade, free- or reduced-price lunch, student ethnicity, or student gender. Likewise, there was no statistically significant difference ($t = 1.95$, $df = 7$, $p > .05$) between the two states regarding the number of team members; and, teams in both states had been implementing PBIS for at least three years.

Procedure

We collected data using trained observers who attended team meetings at each of the participating schools. Prior to attending these meetings, the observers obtained a copy of the minutes from the previous team meeting. The observers' review of the contents of these minutes informed them of (a) any student problems identified by the team and targeted for resolution, and (b) any specific solution actions selected by the team to resolve each problem. The observers recorded this information on the DORA-II instrument before attending the meeting. During the course of the meeting, the observers monitored team members' discussion of the problems and the selected solution actions, and independently recorded data on the DORA-II regarding each problem's solution actions (e.g., whether anyone inquired about implementation of a specific solution action, whether anyone reported on implementation of the solution action, team members' description of the implementation status of the solution action, etc.). For cases in which no team member reported on a selected solution action, the DORA-II data-collection protocol directed the observer to record “NA/Don’t know” as the implementation status of the solution action and no points were awarded.

Instrumentation. Based on a review of documents addressing the conceptual and practical guidance for effective team meetings (see Anderson, 1994; Bradford, 1976; Lencioni, 2004; Mackin, 2007; Perkins, 2009; Tobia & Becker, 1990) and team-based problem solving, we included two sections in the DORA-II. Critical features of the *meeting foundations* for effective problem solving that should be in place at the start, during, and at the end of meetings comprise the first part; and the six processes of *effective problem solving* are represented in the second part of the instrument (see Appendix A).

The “structure” of meetings (e.g., how a team prepares, conducts, and manages the follow-up activities) is important to their effectiveness. Critical “*foundations*” to be observed at the start of a meeting include whether an agenda was distributed, team roles were established, team members were present, relevant data were reviewed, and the meeting started “on time.” During the meeting, quantitative data should be distributed or projected, the status of one or more previous decisions/tasks regarding student social or academic behavior should be reviewed, and the fidelity and impact of one or more implemented decisions/tasks regarding student social or academic behavior should be discussed. At the close of the meeting, the minutes should be distributed; the date and time of the next meeting should be confirmed; and, attendance at the beginning and end of the meeting as well as whether it ended “on time” should be recorded.

Because the *process of effective problem solving* is iterative, we reasoned that observers using DORA-II would also record the cycles of problem-solving and decision-making processes used by team members as they address social or academic problems. Each “problem” was recorded in a single row that included information about the problem being addressed by the team (e.g., who, what, when, where) and reasons or hypotheses for why it occurring, the type of data reviewed, the purpose of the data review, whether the team generated possible solutions for solving the problem, the type of action(s) the team decided to implement, the specific action(s) the team decided to implement, and the type of evaluation accountability the team documented once a decision was reached and recorded.

DORA-II data were collected in real time by an observer who was present for a full team meeting (or at least 70 min). The intent in using and scoring the instrument was to document levels of critical features of effective problem solving rather than to record achievement of pre-determined standardized or benchmarked scores.

Design and Data Analysis

We focused DORA-II on the observable behaviors of team members as they managed meetings and identified problems, identified solutions to those problems, and implemented and evaluated those solutions. We used multiple methods to evaluate the extent to which the use of DORA-II produced data reflective of what we intended it to measure (i.e., validity) and the extent to which repeated use of DORA-II produced similar results (i.e., reliability).

Validity is the extent to which a set of data represents what it purports to represent (Suen & Ary, 1989; Thorndike & Thorndike-Christ, 2009). For DORA-II, data are meant to reflect the extent to which team members followed the six-step TIPS process including the extent to which the process resulted in improvements in identified student academic or social behavior problems. Since we were interested in measuring observable behavior representative of team decision making, we evaluated the content-related validity of DORA-II to provide evidence that information collected was consistent with the underlying knowledge base (i.e., The scale contains items that accurately and adequately represent the content of interest). This aspect of the study replicated a core technical adequacy feature of DORA (Objective 1). We also extended our previous validity analyses by documenting the extent to which teams assessed the fidelity of solutions that were implemented and by confirming the accuracy of their reported and actual problem status indicators (Objective 2).

Reliability is the extent to which a set of data consistently represents what it purports to represent (Gall, Borg, & Gall, 1996; Hawkins & Dotson, 1975; Suen & Ary, 1989; Thorndike & Thorndike-Christ, 2009). For DORA II, this meant documenting the extent to which scores were similar when collected during the same observation by different observers (Objective 1). We trained observers using an "observe, review, and revise" cycle. We used sets of scores recorded by these trained observers to document overall agreement scores as well as item-by-item occurrence agreement indices. We reasoned that reliability was established when occurrence-only inter-observer agreement between the two observers on implementation of solution actions for associated problems was 85% or better on the foundations and each of the six features.

Results

We used multiple methods to address our objectives and to evaluate the extent to which the use of DORA-II produced data reflective of what we intended it to measure (i.e., validity) and the extent to which repeated use of DORA-II produced similar results (i.e., reliability).

Technical Adequacy Replication

We evaluated the content-related validity of the DORA-II using a variation of the "Content Validity Ratio" (CVR) approach recommended by Lawshe (1975). Our goal was to determine the extent of agreement between expected and actual content in our instrument (e.g., Are included items addressing areas that are recommended as critical and essential to the effective problem solving?). We cross-tabulated TIPS foundations and processes with data collected with DORA-II. We assumed adequate content validity if our content represented 80% or more of that included in TIPS-II training. As illustrated in Table 2, DORA-II Foundations reflected 87-100% of the core features recommended by experts for effective meetings. We also documented complete (100%) agreement between areas of problem solving included on DORA-II and the critical features of five widely-accepted problem-solving models (see Table 3).

We used DORA-II to document critical problem-solving features of meetings where team members discussed 12 (27%) new and 32 (73%) old behavior problems. We documented the following discrete features in the problems discussed at the meetings: Who (84.09%), where (93.18%), what (90.91%), when (84.09%), and why (77.27%). The teams focused on group (72.73%) more than individual problems; and, the discussion resulted in a "goal for change" (11.90%) or an indication of when the problem was expected to change (11.36%). The teams followed the TIPS process, and DORA-II was effective at documenting the elements of the process.

As with DORA, we documented inter-rater reliability for DORA-II data with a series of analyses. We calculated the percentage of agreement between pairs of observers by comparing meeting foundation element scores and decision-making thoroughness scores at 20 randomly-selected meetings. Reliability for meeting foundation scores averaged 97% (range 80% to 100%). We also documented agreement for problem identification, problem precision, quantitative data use, goal identification, solution implementation, problem status, and decision after status of problem was reported indicators (see Table 4). The average agreement across observers for these categories ranged from 74% for solution implementation status to 100% for quantitative data use, including agreement of 86% and 83% for problem identification and problem precision, 97% for goal identification, 88% for solution implementation integrity plan, 89% for status of problem reported, 98% for status of problem compared against goal, and 89% for decision after status of problem was reported. Average inter-observer agreement all indicators was 90%.

Technical Adequacy Extension

DORA-II includes codes for documenting discussions of team members related to *implementation* (i.e., not started, partial implementation, implementation with integrity) and *impact* (i.e., NA New Problem, Worse, No Change, Improved but not to Goal, Improved and Met Goal, Unclear, or Not Reported) of solutions implemented to address team-identified problems. Participating schools provided evidence of using SWIS for at least six months. This created an opportunity for a criterion-related validity analysis (Objective 2) for problems that met the following criteria:

1. Was an Old problem (i.e., a problem with a solution selected by the PBIS Team at a meeting previous to the meeting at which the DORA observation was conducted), and
2. Was an Old problem for which the Primary Observer's DORA noted that the status of the problem was reported by the team (necessary for validity analysis of the Impact Score), or
3. Was an Old Problem for which the Primary Observer's DORA included a Solution Score of either "Partial Implementation" or "Implementation with Integrity" (necessary for validity analysis of the Solution Score).

Sixteen problems discussed by teams met criteria for this part of our study and we documented information about partial implementation for 7 (44%) and implementation with integrity for 9 (56%) of them. We were interested in the extent to which what team members reported about problem solutions and impact was confirmed by objective data. This additional analysis extended our focus from if DORA-II accurately measured what teams decided (e.g., about level of solution implementation, and impact of solution implementation on student outcomes) to if team assessments could be validated by external documents. For example, one school proposed to teach behavioral expectations on the bus, and their confirmation was (a) hard copy of the teaching plan, and (b) documented schedule and student performance outcomes from the training. Another school team proposed to deliver tokens for appropriate behavior in the classroom, but a count of tokens delivered did not indicate they had been successful. In both cases an external review of permanent products allowed the researcher to confirm the decision of the team that they had "implemented", "partially implemented" or "not implemented" the proposed solution. Of the 16 problems that could be externally validated, the results from 13 (81%) of team assessments of implementation confirmed the accuracy of the team assessment.

Similarly, we identified 20 problems where the team was able to make an assessment about the impact of the solution on student behavior, and there were external data (SWIS, or permanent products) where the observer could confirm if the team assessment of impact was accurate (e.g. goal met, progress in desired direction, non-effect). On 18 of the 20 (90%) instances the assessment of the team was consistent with the permanent product information. One non-agreement was due to the team accurately assessing student progress, but not being satisfied that the progress was sufficient, even though it met the initially defined goal.

Discussion

Our goal was to document the utility of DORA-II as a measure that may be helpful to researchers focused on improving data-based decision making in schools. The extant knowledge base is heavy on making promises but light on documenting processes or products. For example, there is plenty of advice on what team members should do as problem-solving practices, but little empirical documentation of the extent to which they do them or of their effects on academic or social problems that are the reasons for doing them in the first place (Bergan & Kratochwill, 1990; Blankenship et al., 2010; Boudett et al., 2006a,b; Brown-Chidsey & Steege, 2005; Deno, 1985, 2005; Earl & Katz, 2010; Leithwood, 2010; Little, 2012; Spillane, 2012; Tilly, 2008).

In previous research, we documented the technical adequacy of a tool for recording and analyzing activities and adult behaviors during positive behavior support team meetings (Algozzine, Newton, Horner, Todd., & Algozzine, 2012; Newton, Todd et al., 2009) and used it to demonstrate changes that resulted from teaching team members to systematically solve problems during their school-based meetings (Newton, Algozzine, Algozzine, Horner, & Todd, 2011; Newton, Todd et al., 2009; Todd et al., in press; Todd, Horner, Newton, Algozzine, Algozzine, & Frank, 2011; Todd, Newton et al., 2009). We developed the DORA-II to confirm our understanding of the problem-solving process and to place more emphasis on evaluation of implementation fidelity, "solutions," and "impact." The findings from our preliminary technical analyses reflect that the content of DORA-II is consistent with key components of problem solving recommended in the field and provides a basis for measuring each of these features; and, our confirmation of team-scored solutions and impact with permanent product extends the value of the measure for documenting the ultimate goal of team-based problem solving (i.e., improving academic and social behavior).

Conclusion

Problem solving is cyclical and goal-oriented. Any protocol for documenting it must provide evidence of the extent to which participants engage critical components and stages of the process as well as the extent to which doing so improves problems and benefits students. Using DORA-II, we verified both the level of engagement of teams in expected activities and the outcomes of those activities. We also confirmed selected core features and processes using permanent products obtained and reviewed after the meetings.

Underlying our work was an interest in determining the extent to which teams engaged in core features of effective problem solving. We believe DORA-II has strong potential for better understanding problem solving as an evidence-based practice. To date, models for problem solving are plentiful but data documenting either use of these models or the impact of model use are scarce. Moving problem solving from promise to preferred practice requires proof of implementation integrity and impact; that is, most of what we know about problem solving is grounded in an opinion-base and stakeholders, policy makers, and other professionals need an evidence-base to make informed decisions about education interventions. Our findings provide a base for establishing problem solving as an evidence-based practice.

An important limitation to our present analysis is that of the 40 problems assessed across the 10 teams, only 16 could be externally confirmed for implementation fidelity and only 20 could be externally confirmed for implementation impact. While the results from these problems are encouraging (e.g., team-based assessment was confirmed by the external assessment), it is possible that teams are more likely to be accurate about implementation and impact in situations where clear, external information is available. Further research examining team accuracy in their assessment of solution implementation and impact is needed.

We believe DORA-II to be a valid and reliable index of team problem solving processes. By directly observing team behavior with DORA-II researchers are now able to examine questions such as (a) which steps in the problem solving process are essential? (b) what data are most helpful to teams in their problem solving?, (c) what features of “solutions” improve the likelihood of implementation? and (d) what problem solving practices improve the efficiency of team problem solving? The importance of understanding how to guide, teach and improve team problem solving is reflected in the large about of time, and resources currently spent by educators across the United States. Given the emerging reach and sophistication of data access, now more than ever we need research that will help the field better understand how to do problem solving with efficiency and impact. DORA-II is one measure that may assist researchers to achieve this goal.

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Table 1

Demographic Characteristics of Participating Schools and Teams

	North Carolina		Oregon		
Characteristic	*M*	*SD*	*M*	*SD*	Obtained *t*
School Enrollment (Number)[a]	400.20	70.93	354.75	154.41	0.59
Classroom Teachers (FTE)[a]	27.08	4.73	16.99	6.27	2.76
Student/Teacher Ratio[a]	14.84	1.69	21.02	4.09	-3.11
School Enrollment[a] (Percent)					
Kindergarten	15.61	1.51	15.63	3.87	-0.01
First	14.41	2.41	17.29	3.91	-1.32
Second	14.83	2.68	15.57	0.54	-0.45
Third	16.71	2.51	15.29	1.41	0.88
Fourth	16.26	2.28	21.31	9.31	-1.19
Fifth	16.41	1.06	18.76	9.29	-0.57
School Free Lunch Eligible[a]	253.40	65.63	160.75	87.54	1.82
School Reduced-Price Lunch Eligible[a]	31.40	6.12	21.00	7.02	2.38
Student Ethnicity[a] (Percent)					
African American	45.29	27.12	1.34	0.71	3.20
American Indian	0.84	0.31	1.11	0.80	-0.64
Asian	4.88	4.66	2.10	1.53	1.13
Hispanic	16.13	6.99	24.63	12.92	-1.27
Caucasian	28.28	24.53	64.94	16.48	-2.55
Two or More Races	5.01	2.94	5.14	2.39	-0.07
Student Gender[a] (Percent)					
Male	49.91	2.41	50.68	3.08	-0.43
Number of PBIS Team Members	11.80	1.30	8.25	3.86	1.95

Note. No statistically significant differences ($p < .01$) were found between states.
[a]Retrieved from http://nces.ed.gov/ccd/schoolsearch/

Table 2

Cross-Tabulation of DORA-II Foundations and Recommended Core Features of Effective Meetings

DORA-II Foundations	Recommended Core Features				
	Anderson	*Perkins*	*Haynes*[1]	*Tobia*[2]	*Timm*[3]
1. *Start meeting on time…*	X	X	X	X	X
2. *Share previous minutes…*	X	X	X	X	X
3. *Have agenda available…*	X	X	X	X	X
4. *Have clearly-defined roles…*	N/A	X	X	X	X
5. *Share data to support discussion…*	X	X	X	X	X
6. *Schedule follow-up meeting…*	X	X	X	X	X
7. *End meeting on time…*	X	X	X	X	X
Percent of Recommended Core Features	86	100	100	100	100

[1]Haynes (1988); [2]Tobia & Becker, (1990); [2]Timm (1997)

Table 3

Cross-Tabulation of DORA-II Problem-Solving Processes and Recommended Principles from Practice

DORA-II Problem Solving Process	Recommended Principles from Practice				
	Gilbert	*Bransford*[1]	*Deno*	*Boudett*[2]	*Hamilton*[3]
1. Identify problem with precision	X	X	X	X	X
2. Identify goal for change	X	X	X	X	X
3. Identify solution and create implementation plan with contextual fit	X	X	X	X	X
4. Implement solution with high fidelity	X	X	X	X	X
5. Monitor impact of solution and compare against goal	X	X	X	X	X
6. Make summative evaluation decision	X	X	X	X	X
Percent of Principles from Practice	100	100	100	100	100

[1]Bransford & Stein (1993); [2]Boudett, City, & Murnane (2006a,b); [3]Hamilton, Halverson, Jackson, Mandinach, Supovitz, & Wayman (2009).

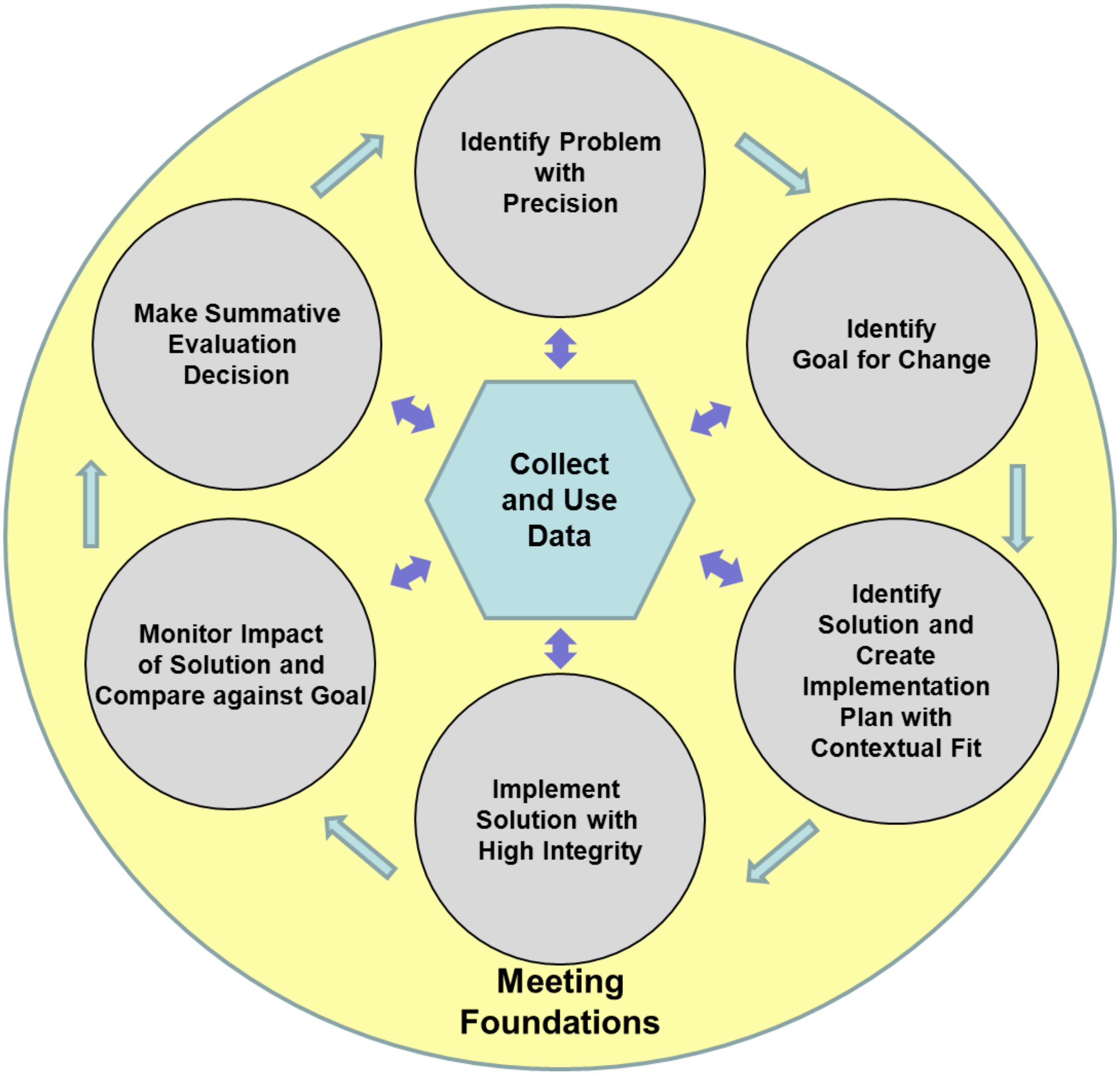
Table 4

Inter-Observer Agreement across TIPS/DORA-II Categories

Category	Average	Minimum	Maximum
Foundations	97.00%	80.00%	100.00%
Problem Identification	86.39%	50.00%	100.00%
Problem Precision	82.95%	20.00%	100.00%
Quantitative Data Use	100.00%	100.00%	100.00%
Goal Identification	96.71%	50.00%	100.00%
Solution Implementation Integrity Plan	88.00%	60.00%	100.00%
Solution Implementation Status	74.44%	0.00%	100.00%
Status of Problem Reported	89.44%	0.00%	100.00%
Status of Problem Compared Against Goal	97.78%	66.67%	100.00%
Decision After Status of Problem Reported	88.89%	0.00%	100.00%
Average	90.16%		

Figure 1

Team-Initiated Problem Solving (TIPS) Model



Appendix A

DORA (Decision Observation, Recording, and Analysis) II

Section 1. Demographic Information

School ID No.: ____________ # PBIS Team Members: ______ Observer Name: ____________ ☐Primary Observer ☐Reliability Observer

Date: ____________ Scheduled Start Time: ______ Scheduled End Time: ____________

If these are research data complete the following:
Group: ____________ State: ______ Condition: ____________ Data Wave No.: ____________

Section 2. Foundations of Effective Team Problem Solving

START OF MEETING	DURING MEETING (ROLES)	END OF MEETING
01. ☐ Meeting started within 10 minutes of scheduled start time	05. ☐ Facilitator	08. ☐ Next meeting scheduled
02. ☐ At least 75% of team members present at the start of the meeting	06. ☐ Minute Taker	09. ☐ Meeting ended within 10 minutes of scheduled end time (includes a revised end time that team members agreed to)
03. ☐ Previous meeting minutes available	07. ☐ Data Analyst	10. ☐ At least 75% of team members present at the end of the meeting
04. ☐ Agenda available		

Notes:

Section 3. Team Problem-Solving Processes

Operational definition of a "problem" - At least one team member or meeting participant ☐ identifies a student social or academic behavior to change, AND ☐ the team selects/selected a solution to bring about the desired change.

PRECISE PROBLEM & GOAL FOR CHANGE IDENTIFIED	SOLUTION IDENTIFIED AND IMPLEMENTATION PLAN CREATED & SOLUTION IMPLEMENTED WITH INTEGRITY	IMPACT OF SOLUTION MONITORED AND COMPARED AGAINST GOAL & SUMMATIVE EVALUATION DECISION MADE
Problem No. ____ **PR** ____ **Description of identified problem** **1.1 Problem Precision** What ☐ Who ☐ Where ☐ When ☐ Why ☐ **Problem Category** Social Behavior ☐ Academic Behavior ☐ **Problem Features** New ☐ Old ☐ | Individual ☐ Group ☐ **1.2 Quantitative Data Use** Social Behavior ☐ Academic Behavior ☐ **Description of data presented** **2. Identified Goal** What Change ☐ By When ☐ **Description of change to be achieved** ☐ Postponed/out of time ☐ Old problem not discussed	**Description of selected solution** Write description of Solution below, including its individual components or "solution actions." **3. Solution Implementation Plan** NA Old Prob. ☐ Person ☐ Imp. Timeline ☐ Integrity What ☐ Integrity When G/R ☐ Integrity Who ☐ **Description of implementation integrity plan** **4. Solution Implementation-Integrity** NA New Prob. ☐ Not Started ☐ Part. Imp. ☐ Imp. w/ Integrity ☐ Stopped. ☐ Not reported/ DK ☐ ☐ Postponed/out of time	**5. Status of Problem Reported – Direction of Change & Relation of Change to Goal** NA* (See Protocol) ☐ Worse ☐ No Change ☐ Imprv. but not to Goal ☐ Imprv. & Met Goal ☐ Unclear ☐ Not Reported ☐ **Description of status of problem (i.e., summary of findings from qualitative and/or quantitative data) or NA if New Problem** **Data source for report on status of problem (NA if New Problem)** **6. Summative Evaluation Decision (Note: Check "No" if team did not report status of problem)** (Note: Examples of summative evaluation decisions include (a) retaining, revising, or terminating (a) the solution, (b) the goal, (c) the precisely-defined problem, or (d) some combination of the preceding) NA New Problem ☐ Yes ☐ No ☐ **Description of decision or NA if New Problem** ☐ Postponed/out of time