

The Team Functioning Scale:
Evaluating and Improving Effectiveness of School Teams

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Abstract

While there has been considerable research on team effectiveness in business, military and healthcare environments, there is a relative scarcity of research that examines characteristics of effective teams within a school. This study focuses on facilitating improvement of school teams with the Team Functioning Scale (TFS), a 17-item scale designed to capture and evaluate overall functioning of a team implementing a school improvement process. The TFS is a reliable and valid scale that measures how individual team members observe team functioning and supports continual improvement in team structure, focus, meaningful communication and shared decision-making, ideally resulting in higher-functioning teams with increased potential for effectiveness. The TFS is sensitive and responsive to change over time, indicating potential as a mechanism for improving teaming practices.

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Highlights:

- TFS evaluates overall functioning of a team implementing a school improvement process.
- The 17 items render a total and 3 domain scores: Structure, Communication, and Focus.
- Demonstrates high reliability with Cronbach's alpha .964 (domain alphas .843 to .950).
- Reliable across 3 states where administered, with Cronbach's alphas of .960-.970.

- Supports continual improvement in team functioning as it is sensitive across time.

The Team Functioning Scale: Evaluating and Improving Effectiveness of School Teams

For teachers and administrators, school teams are a part of work life and a key component of most education improvement initiatives (Algozzine, Newton, Horner, Todd, & Algozzine, 2012; Markle, Spleet, Maras, & Weston, 2014). In the context of this research, a team is defined as three or more individuals who interact to achieve common goals and accomplish productive outcomes. In addition to structural elements, there are processes within teams that help account for real differences in outcomes (Brannick, Prince, Prince, & Salas, 1995; Brannick, Salas, & Prince, 1997). Driskell, Salas and Hogan (1987) described effective teams as “productive, cohesive, and resistant to performance degradation under stress” (p. ii).

There is a considerable body of research on teams and team processes dating back to the 1930s (Richards, 1994; Baker, Horvath, Champion, Offermann, & Salas, 1999). The prevalent framework for describing teams and team effectiveness has been a systems model including inputs, processes and outputs of the team (Baker et al., 1999; Barrick, Steward, Neubert, & Mount, 1998). Increasingly focus has shifted to conceptualizing a model of team effectiveness that looks more closely at core characteristics of high-performing teams whose members represent different disciplines, domains, or even cultures. For example, Baker et al. (1999, 2005) discussed core team skills, knowledge, and competencies that are important to the effectiveness of an international team working on adult learning and literacy. These competencies include group decision making, planning, adaptability/flexibility, and interpersonal relations (Baker et al., 1999, 2005). Based on pilots conducted with the U.S. Army’s European Command, Prevous, Veatch, and Sullivan (2009) explored how teams of leaders from autonomous organizations gained shared situational understanding, purpose, trust and confidence to achieve successful outcomes. This “teams of leaders” approach has also been applied and studied with interdisciplinary health research teams (Prevous, Hilton, Hower, McGurn, & Gibson, 2011).

In the current American education system, interdisciplinary teams are the norm rather than the exception in schools (Algozzine et al., 2012). This trend is largely due to legislation like the Individuals with Disabilities Education Improvement Act (IDEA) of 2004, which increased the implementation of tiered models of support such as Positive Behavior Interventions and Supports (PBIS) and Response to Intervention (RTI) (Markle et al., 2014). These school improvement interventions require teams, made up of individuals from across the school, to effectively collaborate on functions like planning service delivery, implementing evidence-based practices, and promoting systems change (Bahr & Kovaleski, 2006; Bahr, Whitten, & Dieker, 1999; Nellis, 2012).

In addition to productivity improvements, there are other clear benefits to effective teaming in education. For example, increased communication among professionals resulting from teaming (Weist, Mellin, Chambers, Lever, Haber, & Blaber, 2012) allows team members to align their goals, reduce unnecessary duplication of services, increase professional support, and decrease staff burnout (Anderson-Butcher & Ashton, 2004). Teachers can be empowered through team participation to voice opinions and take an active role in educational improvement efforts (Somech, 2005). Educators who participate in teams are more effective teachers, show increased problem solving, and provide a higher quality of education for students (Jurasite-Harbison & Rex, 2010; Somech, 2005).

School culture can also be positively impacted by teaming as teacher involvement in the development and implementation of learning practices creates an environment responsive to the community context. As team members, staff can promote the school’s collective values, beliefs,

behaviors, traditions, and norms that comprise culture (Stolp, 1994). This, in turn, contributes to shared decision making with administrators and community members (West, 1990). Furthermore, inter-professional collaboration in schools is associated with increased student attendance and academic achievement (Oppenheim, 1999), decreased levels of student misconduct (Smith, Armijo, & Stowitschek, 1997), and decreased referrals for evaluation and placement in special education (Kovleski & Glew, 2006). Clearly, school teaming is related to school culture, and an important component for improving outcomes.

While there has been considerable research on team effectiveness in business, military and healthcare environments, there is a relative paucity of research that examines characteristics of effective teams within a school. This study focuses on facilitating improvement of school teams through the use of the Team Functioning Scale (TFS), a 17-item scale designed to capture and evaluate overall functioning of a team implementing a school improvement process. The TFS indicates how individual team members observe team functioning and supports continual improvement in team structure, focus, meaningful communication and shared decision-making, resulting in higher-functioning teams with increased potential for effectiveness.

Dimensions of Team Functioning

There are many dimensions within the concept of teaming that range from meeting logistics (e.g., start and stop times) to more complex concepts such as shared vision, communication effectiveness and leadership. At the basic level, structural elements such as agendas, specific start and stop times, and a note-taking system promote meeting quality and team meeting effectiveness (Nixon & Littlepage, 1992). Team meetings must be well implemented to achieve outcomes and realize their goals (Newton, Algozzine, Algozzine, Horner, & Todd, 2011; Truscott, Cohen, Sams, Sanborn, & Frank, 2005). Not surprisingly, teams with structural elements in place are more productive, and members feel good about the time commitment (Allen & O'Neill, 2011).

At a higher level, shared vision, communication and leadership are also important for successful team functioning; teams with a shared vision are more likely to perform at high levels, primarily due to a sense of purpose (Bishop, Scott, Goldsby, & Cropanzano, 2005; Wageman, Hackman, & Lehman, 2005; Prevu et al., 2009, 2011). Attitudes of team members are often based on the quality and relevance of a project, as well as a sense of cohesion or belonging to the group (Longo, 2005). The greater the perceived importance of a member's contribution, the more likely they are to be highly invested in the end product. Furthermore, communication and leadership influence group quality and team effectiveness. Shared leadership, where teams of teachers share joint decision-making, promotes a culture of collaboration (Gupta, Huang, & Niranjana, 2010; Wildy, Forster, Loudon, & Wallace, 2004). A group's sense of trust and belonging among its members develops into a shared desire to work toward successful projects and shared goals (Peters & Karren, 2009).

Measuring Team Effectiveness

Historically, team effectiveness was measured largely by the number of projects completed, without regard to quality of the products or outcomes (Cantu, 2007; Wageman et al., 2005). As the study of teams has progressed, research has shifted to examining the quality of team performance and its positive relationship to the quantity of production (Wageman et al., 2005). The relationship between team processes and team outcomes has been well established in research (Brannick, Roach, & Salas, 1993). The measurement constructs vary depending on the theoretical framework used in the research, with some focused on individual team member characteristics and attributes (e.g., the Model of Effective Team Functioning, Dickenson,

McIntyre, Ruggeberg, Yanushefski, Hammill, & Vick, 1992), while others are primarily concerned with team performance in areas like communication, coordination and cohesiveness (Brannick et al., 1993; Brannick et al., 1997; Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Helmreich & Foushee, 1993). In an overview of team performance and training, Cannon-Bowers and Salas (2001) suggest that measures should include both team and individual unit analysis, capture processes as well as outcomes, describe and diagnose performance, and help provide knowledge of results to teams for developmental feedback.

Both outside observers and internal team members have been used to measure team processes, and each approach has advantages and disadvantages depending on the focus of the evaluation. For example, when the purpose is to evaluate team processes to predict successful team outcomes, outside observers have been more effective than team member evaluations (Brannick et al., 1993, 1995). The disadvantage, however, is that multiple observations may be necessary for accuracy and reliability (Brannick et al., 1995). On the other hand, when the purpose is to understand the attitudes or emotions underlying individual team member behavior that can impact the team's effectiveness or to understand affective reactions within the team, team members are the best sources of information (Brannick et al., 1993). Using a team member to evaluate the team's outcome, however, can be problematic because of the individual's emotional (or professional) investment in the outcome (Brannick et al., 1993).

The environment in which teams operate is becoming increasingly dynamic and complex (Tannenbaum, Mathieu, Salas, & Cohen, 2012), requiring team members to continuously adjust processes and even team membership. For that reason, there are advantages to having observers who are also team members because they could more easily adapt their evaluation of the team processes to the changing context than an outside observer. This suggests a need for a measurement tool that enables individual team members to record their observations of the team's processes.

Development and Construction of Team Functioning Scale (TFS)

The Team Functioning Scale (TFS) is a 17-item online survey designed to capture and evaluate overall functioning of a team implementing a school improvement process. The TFS indicates how members observe team functioning and composite results support continual improvement in the quality of team meetings regarding their structure, focus, meaningful communication and shared decision-making. The TFS is quick and easy to complete, and supports continual improvement in the quality and functioning of team meetings. The survey allows educational teams the opportunity to develop higher team effectiveness by debriefing about areas needing improvement and areas of success.

The TFS grew from ten years of experience providing ongoing professional development to educational teams and reflecting on the characteristics of effective and ineffective teams. A list of components of effective team meetings and teaming protocols was developed, and then a review of research and existing measures was completed to verify and modify the list. Two existing instruments were useful in guiding the development of the TFS: The Team/Department Meeting Observation Guide and Checklist (Gunhold, 2009) and the Team-Initiated Problem Solving (TIPS) Team Implementation Fidelity Checklist (Newton et al., 2011). Business consultant Ryan Gunhold (2009) developed the Observation Guide and Checklist to help his clients structure and run meetings more effectively and efficiently. Once a team has formed and is underway, the TIPS Fidelity of Implementation Checklist (Newton et al., 2011) is designed to monitor progress of PBIS teams.

The Team/Department Meeting Observation Guide and Checklist (Gunhold, 2009) is intended to prompt more effective meetings by asking observers to note the presence or absence of certain behaviors. The five sections of the instrument capture observations related to the overall meeting, the leadership, interactions among team members, and meeting processes. Open-ended questions are used for team member inputs, and an anchored five-point Likert scale allows all team members to evaluate the overall meeting.

In schools that are implementing School-Wide Positive Behavior Intervention and Supports (SW-PBIS), teams meet regularly to review student data and identify/address students' needs (Newton et al., 2011). The Team-Initiated Problem Solving (TIPS) model developed by Newton et al. (2011) embeds data-based decision making into a broader framework to ensure that problem-solving is thorough, logical, efficient, and effective for these SW-PBIS teams. The teams collect and use data to identify problems, develop hypotheses, discuss and select solutions, develop and implement action plans, then evaluate and revise those action plans. This rating scale is completed by the team, through discussion, during a meeting. The structure of the team meeting lays the foundation for the model and includes the use of electronic meeting minute system, formal roles (facilitator, recorder, data analyst), specific expectations (before, during, and after meetings), access and use of data, and projected meeting minutes (Newton et al., 2011). The authors claim that predictability, participation, accountability, and communication make for a successful meeting and that the key to collective problem solving is to provide a visual context that allows everyone to follow and contribute (Newton et al., 2011).

Team Functioning Scale. Initially the developers hoped to adopt existing measures, but due to limitations of those approaches (e.g., time-intensity of observations, not gaining the perspective of each team member, and either being too specific or too vague for use across educational teams), it was determined that a new measure would better capture the existing functioning and support the continued improvement of educational teams.

Once evidence-based teaming elements were organized, items addressing each element were written. The instrument was designed as a rating scale/rubric hybrid providing both the characteristics of strong and weak teams. The twenty drafted items were then reviewed by five professional development providers. The reviewers analyzed each item for clear and concise descriptions, measuring a single construct, ease of rating for team members, importance for team functioning, and limited overlap with other items. Three items were found to lack one or more of the criteria. Recommendations resulted in the deletion of two items and the combining of two items into one, resulting in a 17-item scale. The scale was then tested with thirteen school teams. Domain means for these teams ranged from 2.20 to 4.92 in Structure, 2.57 to 4.89 in Communication, 2.00 to 4.96 in Focus, and 2.39 to 4.90 for the overall scale. Feedback obtained through a discussion with members of each of the fourteen teams identified no changes to the scale, with team members stating that the items were easy to understand and to rate and that they felt that each item represented an important component of teaming. These thirteen teams also reflected on the usefulness of the summary report for continued improvement. The team members reported that the information was useful, and based on the summary report data, each team identified a strategy that they could implement to improve their teaming.

Two formats of the Team Functioning Scale were then released, an online version and a paper version. The online version was programmed on a website so that it mirrored the look of the paper format. For both formats, the instructions stated, "To enact sustainable improvements, team meetings must be structured, focused, and support meaningful communication and shared

decision-making. Each team member is asked to respond to this short survey, thinking about the last three team meetings.” The Team Functioning Scale is provided in Figure 1.

Figure 1: Team Functioning Scale

Meeting roles unassigned	1 2 3 4 5	Multiple meeting roles assigned prior to the meeting (e.g., facilitator, note-taker)
Ever-changing start and stop times (e.g., members straggle in, waiting for leadership, meetings sometimes cancelled)	1 2 3 4 5	Meeting starts and ends on time as scheduled
Irregular attendance by team members	1 2 3 4 5	Nearly all team members attend regularly
Nonexistent or limited use of agendas	1 2 3 4 5	Agenda developed and available prior to meetings
Nonexistent or limited use of meeting minutes/notes	1 2 3 4 5	Minutes/notes taken during meeting and distributed to all team members after the meeting
Minimal team member engagement (e.g. members off-task, distracted)	1 2 3 4 5	High level of engagement from all team members (e.g., verbal input, attention, willingness to complete tasks)
Discussions disjointed (e.g., numerous interruptions, sidebar conversations)	1 2 3 4 5	Discussions stay on track; no sidebar conversations
Poor team member communication (e.g., aggressive tones, lack of listening, disrespect)	1 2 3 4 5	Team members communicate effectively (e.g., speak directly, ask questions, express support, restate ideas)
Disagreements/conflicts aren't addressed (e.g., disgruntled team members, talking behind backs)	1 2 3 4 5	Disagreements/conflicts are addressed (e.g., problem solving, respect, listening)
Some members are not valued as important to the team		Members value each other's roles and contributions
Members are not provided time/forum to share viewpoints; limited discussion time before a decision is made	1 2 3 4 5	All viewpoints shared and given adequate time prior to decision-making (e.g., discussion of options and consequences)
Final decision made with limited input by team (e.g., one person makes decision, limited influence, no voting)	1 2 3 4 5	Shared decision-making with balanced influence of team members (e.g., voting on decisions, discussion of options)
Lack of meeting purpose (e.g., meeting “for the sake of meeting”)	1 2 3 4 5	Meeting has clear purpose, which is communicated in advance
Data does not drive decision-making	1 2 3 4 5	Data drives decision-making (i.e., relevant data is reviewed and discussed; decisions clearly influenced by data)
No reference to past goals/action items	1 2 3 4 5	Status of action items from last meeting is reviewed
Action items not identified, unclear responsibilities	1 2 3 4 5	Clear action items (e.g., deadlines, person responsible)
Meetings are not productive and do not result in progress	1 2 3 4 5	Meetings are productive; continual progress focused on purpose

Method

This study focuses on facilitating improved performance of educational teams through a survey of team functioning that is completed individually by each team member, as well as structured discussion questions for debriefing multidisciplinary groups and promoting reflection and improvement of team functioning. Specifically we seek to answer the following research questions:

- 1) What is the scale and domain reliability for the Team Functioning Scale?

- 2) Overall, what items have the highest and lowest level of implementation within educational teams? For low-performing teams, what domains/items are the highest and lowest? For high-performing teams, what domains/items are the highest and lowest?
- 3) Does the domain structure specified for the Team Functioning Scale hold for this sample?
- 4) Is the Team Functioning Scale sensitive to change over time?

Settings and Participants

The data used for the Team Functioning Scale reliability analysis was collected between November of 2012 and March of 2013 and includes three states with 2,735 respondents, 2,690 of which had complete records (98.4%). The geographic locations represented by these three states are the Midwest, the Southwest, and the Northwest. The Midwestern state included 2,472 respondents from 150 schools (1 Preschool, 123 Elementary, 15 Middle, 7 High Schools, and 4 district teams) in 73 districts. The number of staff responding for each school ranged from 1 to 44. The Southwest state included 51 complete records from 13 high schools in 11 districts, and the number of staff responding per school ranged from 2 to 6. The Northwest state included 167 complete records from 38 districts, and the number of staff responding for each district-level team ranged from 1 to 25. Each team of respondents was participating in an educational improvement process that included teaming and taught strategies for effective teaming.

The TFS was administered in the three states again between January and March of 2014. Data collected from the Midwestern state and included 2,932 respondents from 215 schools (2 Preschools, 142 Elementary, 24 Middle, 34 High Schools, and 12 district teams) in 81 districts. The number of staff responding per school ranged from 1 to 48. Spring 2014 data collected from the Southwestern state included 56 participants from 12 high schools in 10 districts, with three to five staff responding per team. Spring 2014 data collected from Northwestern state included a total of 245 respondents, but only 79.2% were complete; thus the number of respondents for analysis is 194. Forty-six district-level teams participated with 1 to 25 respondents per team.

The 2014 team means for the total Team Functioning Scale and for the Structure, Communication, and Focus domains were compared to the 2012-2013 means to examine the scale's sensitivity to change from year to year. One hundred and four teams participated in both the first and second administration. These were matched by district and school, and paired *t*-tests were conducted to investigate significant differences. This group consisted of 75 schools (64 elementary, 9 middle, 1 high school, and 1 district team) from 44 districts in the Midwestern state, 1 high school from the Southwestern state, and 34 district teams in the Northwestern state.

Statistical Analysis and Procedures

Scale reliability is the proportion of variance attributable to the true score of the latent variables, and internal consistency reliability is concerned with the homogeneity of the items within the scale (DeVillis, 2003), or that the items are highly intercorrelated. This internal consistency is typically equated with Cronbach's (1951) coefficient alpha. Cronbach's coefficient alpha value was computed for the Team Functioning Scale overall, as well as for the three domains of Structure, Communication, and Function. This was done for all three state samples, and for the total dataset.

The overall means and standards deviations for the total scale, each domain, and each item were calculated and ranked in order to identify the highest and lowest implemented domains and items. The lowest performing and highest performing teams (consisting of three respondents or more) were identified by computing a mean sum or composite score of the Team Functioning Scale for each team, and ranking the teams by that total score. For these lower and higher performing teams, the means and standard deviations for the total scale, each domain, and each

item were calculated. The domain and item means for the lower and the higher performing teams were ranked to identify the lowest and highest implemented domains and items.

A Confirmatory Factor Analysis (CFA) (Tabachnick & Fidell, 2007) specifying three factors (i.e., Structure, Communication, and Focus domains) was conducted on the entire dataset. Principal Component Analysis was employed as the extraction method and Promax Rotation for oblique or correlated factors was employed as the rotation method (Tabachnick & Fidell, 2007). The Eigenvalues and percent of variance accounted for by each factor are reported, along with the total percent of variance accounted for by the three factors. The individual item loadings for the three-factor rotated component matrix are reported.

To examine sensitivity over time, the Team Functioning Scale total score mean along with the domain means were compared from the first administration in 2012-2013 to the second administration in 2014. The difference scores or changes between administration times were calculated and are reported. Any teams that participated in both Team Functioning Scale administrations were matched by district and school numbers. The mean total scale score and mean domain scores for these teams were subjected to Paired *t*-tests (Green & Salkind, 2011) to examine changes between administrations. An alpha value of $p < .05$ was used to indicate significance.

To investigate how teams used the Team Functioning Scale results to improve their teaming practices, 14 teams participated in a debriefing in February of 2014. Each team received a summary report of their results and a discussion guide which included open-ended questions regarding the utility of the Team Functioning Survey and asked them to identify team strengths and areas for improvement, why the team thought it was important to improve their weakest area of team functioning, and actions that would help them improve their area(s) of need. Teams were also asked to complete the phrase, “It is beneficial to look at team function because...” All results of the debriefing session were analyzed using qualitative analysis to identify themes with comments quoted as representative exemplars (Merriam, 2009).

Results

Reliability

The instrument was found to demonstrate high reliability with a Cronbach’s alpha of .964 (N=2,690) for the 17 items on the Team Functioning Scale. The Structure domain with 5 items produced a Cronbach’s alpha of .843 (N=2,695), the Communication domain with 7 items produced a Cronbach’s alpha of .950 (N=2,697), and the Focus domain with 5 items produced a Cronbach’s alpha of .934 (N=2,697). These results can be seen in Table 1. None of the items, if deleted, would significantly increase either their domain reliability estimates or the total scale reliability.

The TFS was also highly reliable across states, with Cronbach alpha’s for the overall scale ranging from a low of .960 (N=167) to a high of .970 (N=51). Domain reliabilities across states ranged from .838 (N=2,472) for Structure to .952 (N=2,472) for Communication (see Table 1).

Table 1
Reliability Estimates for Team Functioning Scale and Domains

State	Scale	N	Number Items	Cronbach's Alpha
Overall	Structure	2695	5	0.843
	Communication	2697	7	0.950

	Focus	2697	5	0.934
	Total	2690	17	0.964
Midwestern	Structure	2472	5	0.838
	Communication	2472	7	0.952
	Focus	2472	5	0.934
	Total	2472	17	0.964
Northwestern	Structure	172	5	0.853
	Communication	169	7	0.934
	Focus	169	5	0.922
	Total	167	17	0.960
Southwestern	Structure	51	5	0.896
	Communication	56	7	0.944
	Focus	56	5	0.933
	Total	51	17	0.970

Overall Item Means, Domains, and Ranks

The domain with the highest mean scores over all educational teams was Communication with teams scoring a mean 81% of the 35 points possible and a mean score of 4.07. Teams also scored a mean of 80% of the 35 points possible on the Focus domain with a mean score of 4.01. The domain with the lowest scores for the educational teams was Structure with teams scoring a mean of 79% of the 25 points possible and a mean for all educational teams on the Structure domain of 3.97.

Overall, the highest rated item was S3 (Nearly all team members attend regularly) with a mean of 4.37. Items C8 (Team members communicate effectively) and C10 (Members value each other's roles and contributions) were also highly ranked with means of 4.21 and 4.18, followed by item F13 (Meeting has a clear purpose, communicated in advance) with a mean of 4.14 and item S2 (Meeting starts and ends on time as scheduled) with a mean of 4.13. Overall, the lowest rated item was S1 (Multiple meeting roles assigned prior to meeting) with a mean of 3.56. Items S5 (Minutes/notes taken during meeting and distributed after meeting) and F15 (Status of action items from last meeting reviewed) were also ranked low with means of 3.56 and 3.70, followed by item C7 (Discussions stay on track; no sidebar conversations) with a mean of 3.82 and item F16 (Clear action items) with a mean of 4.02.

Lowest Performing Team Item Means, Domains, and Ranks

Of the ten lowest performing teams (with N>2), as determined by their total Team Functioning Scale scores, three teams scored less than 50% of the 85 points possible on the total Team Functioning Scale, and the other seven teams scored between 50% and 59% of the total points possible on the scale. The domain with the highest mean scores for these low-performing teams was Communication with only one team scoring less than 50% of the 35 points possible. Six teams scored between 50% and 59%, and three teams scored above 60% of the total Communication points possible. The domain with the lowest scores for these low-performing teams was Structure with six teams scoring less than 50% of the 25 points possible, and two teams scoring between 50% and 59%, and two teams scoring 60% or above on the Structure domain. For the Focus domain four teams scored under 50% of the 25 points possible, five teams scored 50-59%, and one team scored above 60% of the domain points possible.

Running head: TEAM FUNCTIONING SCALE

The Team Functioning Scale items with the highest means for the ten lowest performing teams were S3 (Nearly all team members attend regularly), C8 (Team members communicate effectively), and C10 (Members value each other's roles and contributions) with means of 2.93, 2.95, and 3.09 respectively. The items with the lowest means for low-performing teams were S1 (Multiple meeting roles assigned prior to meeting), F15 (Status of action items from last meeting reviewed), and S5 (Minutes/notes taken during meeting and distributed after meeting) with means of 2.10, 2.33, and 2.38, respectively. The descriptive statistics (including mean and standard deviation) for the 10 lowest performing teams on the Team Functioning Scale items, domains, and total scale are presented in Table 2.

Table 2
Item/Domain Descriptives for Low- and High-Performing Teams Ranked by Mean

Items	Low Performing Teams				High Performing Teams			
	N	Mean	Std. Dev.	Rank	N	Mean	Std. Dev.	Rank
S1 Multiple meeting roles assigned prior to meeting	59	2.1	1.227	1	103	4.73	0.546	4
S2 Meeting starts & ends on time as scheduled	59	2.61	1.427	8	103	4.8	0.472	9
S3 Nearly all team members attend regularly	58	2.93	1.387	15	103	4.86	0.372	15
S4 Agenda developed & available prior to meeting	58	2.45	1.465	5	103	4.87	0.362	16
S5 Minutes/notes taken during meeting & distributed after meeting	58	2.38	1.400	3	103	4.83	0.596	13
C6 High level of engagement from all team members	58	2.71	1.214	10	103	4.78	0.463	7
C7 Discussions stay on track; no sidebar conversations	57	2.79	1.098	13	103	4.42	0.679	1
C8 Team members communicate effectively	57	2.95	1.315	16	103	4.77	0.509	6
C9 Disagreements/conflicts are addressed	56	2.86	1.458	14	103	4.72	0.617	3
C10 Members value each other's roles & contributions	57	3.09	1.503	17	103	4.84	0.390	14
C11 All viewpoints shared & given adequate time prior to decision-making	56	2.75	1.352	12	103	4.74	0.442	5
C12 Shared decision-making with balanced influence of team members	56	2.46	1.334	6	103	4.71	0.457	2
F13 Meeting has a clear purpose, communicated in advance	56	2.71	1.345	11	103	4.83	0.430	11
F14 Data drives decision-making	57	2.65	1.302	9	103	4.83	0.473	12
F15 Status of action items from last meeting reviewed	57	2.33	1.286	2	103	4.81	0.466	10
F16 Clear action items	56	2.43	1.346	4	103	4.88	0.351	17
F17 Meetings are productive; continual progress focused on purpose	56	2.54	1.250	7	103	4.79	0.457	8
Domains	N	Mean	Std. Dev.	Rank	N	Mean	Std. Dev.	Rank
Structure	58	2.49	1.149	1	103	4.82	0.330	3
Communication	56	2.79	1.176	4	103	4.71	0.358	1
Focus	56	2.54	1.155	2	103	4.83	0.358	4
Total Team Functioning Scale	56	2.63	1.101	3	103	4.78	0.295	2

Highest Performing Team Item Means, Domains, and Ranks

The highest performing teams (with N>2), as determined by their total Team Functioning Scale scores, included four teams scoring between 93% and 95% of the 85 points possible on the total Team Functioning Scale, and six teams scoring above 95% on the total scale with one team scoring 100%. The item scores for the high-performing teams ranged from 3.88 to 5.00 with a mean of 4.78.

The domain with the highest mean scores for these high-performing teams was Focus with three teams scoring less than 95% of the 25 points possible, six teams scoring 95% to 99%, and one team scoring 100% on the Focus domain. The domain with the lowest mean scores for these high-performing teams was Communication with five teams scoring less than 95% of the 35 points possible, four teams scoring 95% to 99%, and one team scoring 100% on the Communication domain. On the Structure domain four teams scored under 95% of the 25 points possible, five teams scored 95% to 99%, and one team scored 100% of the 25 points possible on the Structure domain.

The Team Functioning Scale items with the highest means for the 10 highest-performing teams were S3 (Nearly all team members attend regularly), S4 (Agenda developed and available prior to meeting), and F16 (Clear action items) with means of 4.86, 4.87, and 4.88, respectively. The items with the lowest means for high-performing teams were C7 (Discussions stay on track; no sidebar conversations), C12 (Shared decision-making with balanced influence of team members), and C9 (Disagreements/conflicts are addressed) with means of 4.42, 4.71, and 4.72, respectively. The descriptive statistics (including mean and standard deviation) for the 10 highest performing teams on the Team Functioning Scale items, domains, and total scale are also presented in Table 2.

Domain Structure for the Team Functioning Scale

A Confirmatory Factor Analysis (CFA) specifying three factors/domains was conducted in which Principal Component Analysis was the extraction method and Promax Rotation for oblique or correlated factors was employed. Results indicated that only two factors, Communication with 11.05 and Structure with 1.03, had Eigenvalues equal to 1.0 or higher. The two factors accounted for 71.08% of the total variance in responses, but the three factor solution accounted for 75.12% of the total variance. The Eigenvalue for the Focus factor equaled 0.686. The “elbow” of the Scree Plot, or the point at which the line stops dropping and begins to level out, is another way to determine the appropriate number of factors among a scale (Tabachnick & Fidell, 2007). The Scree Plot contained a large drop after the first factor, a slight decrease after the second factor, and by the third factor the line had levelled. The argument can be made for a three-factor solution, especially in light of the respectable reliability estimates for each domain and the amount of additional variance accounted for the inclusion of the third factor.

The Communication domain revealed item loadings between .774 and .907, with all items having excellent loadings ($> .71$) according to Comrey and Lee’s 1992 guidelines for item-factor loadings. All seven items had the highest loadings in the Communication domain. The Structure domain revealed item loadings between .541 and .844, with three of the five items having their highest loading values in the Structure domain. There were three items with excellent loadings ($> .71$), one good ($> .55$), and one fair item-factor loading ($> .45$). The Focus domain revealed item loadings between .631 and .803, with four excellent loadings and one very good item-factor loading. Only one of the five items had their highest loadings on the Focus domain. All items had loadings on their intended factors that were interpretable above .32. While the analysis showed the cross-loading of some items between factors, results discussed later reveal that teams found the three-domain structure aided in interpretation of the results.

Team Functioning Scale Sensitivity to Change Over Time

Across the three states, 110 teams administered the Team Functioning Scale in both 2012-2013 and 2014. Between the two administrations, these teams were actively implementing educational improvement initiatives and participating in professional development focused both on the initiative components and effective teaming strategies. Paired or Dependent *t*-tests

revealed a statistic of $t(109) = 2.542, p = .012$ for the total scale mean, which increased significantly from a mean of 3.874 to 3.964. The Communication domain significantly increased from a mean of 3.972 to 4.062 and the Focus domain significantly increased from a mean of 3.837 to 3.942. However, the Structure domain did not produce a significant increase with $t(109) = 1.863, p = .065$, although the 2014 mean of 3.845 was higher than the 2013 mean of 3.771. The TFS does seem to be sensitive to change over time, as the scores increased significantly between the 2012-2013 to the 2014 administration. These results can be found in Table 3.

Table 3
Paired *t*-test Results and Domain Means for 2013 and 2014 Comparison

Domain	Mean 2013	Mean 2014	t	df	sig.
Structure	3.771	3.845	1.863	109	0.065
Communication	3.972	4.062	2.624	109	0.010
Focus	3.837	3.942	2.632	109	0.010
Total Scale	3.874	3.964	2.542	109	0.012

Limitations

Limitations of this research study include convenience sampling and self-reported observation data. While the teams represented a variety of community sizes, they span only three States. Additionally, the scale collects participants' self-reported observations of team functioning. Self-reported data in rating scales can be a limitation for many reasons such as systematic response distortions, method variance and acquiescent response bias (Razavi, 2001; Welkenhuysen- Gybels, Billiet, & Cambre, 2003); however, this study minimized risks associated with self-report methodologies through standardizing the administration instructions which stated, "To enact sustainable improvements, team meetings must be structured, focused, and support meaningful communication and shared decision-making. Each team member is asked to respond to this short survey, thinking about the last three team meetings." Also to mitigate this bias, the survey items were also designed to ask about individual perceptions of the team's functioning. Survey response options were purposely constructed to ask school staff to only report on their perception of team functioning items on a continuum from 1 to 5 (e.g., 'Nonexistent or limited use of agendas' to 'Agenda developed and available prior to meetings'). Overall, Likert scales have been found to provide reliable and valid information (Maurer, & Andrews, 2000).

An additional limitation lies in the reported results across time. Due to changes in school staff and team membership, it is possible, and even likely, that some of the participants that completed the scale in 2012-2013 were no longer on the teams in 2014 and new members joined the teams. It is not known how these changes in team membership influenced the results across time. Because individual identifiers were not included in the survey, it is not possible to conduct the repeated measures analysis by participant. In future research, identifying information could be collected to allow for this analysis.

Finally, the current research study focused on the construct validity of the *Team Functioning Scale*. No criterion-related validity was studied. "Criterion-related validity is evaluated by comparing the test scores with one or more external variables called criteria considered to provide a direct measure of the characteristic or behavior in question" (Messick, 1990, p. 7). In order to examine the criterion-related validity, a scale is required to have an

empirical association with some criterion or “gold standard” (DeVellis, 2003, p. 50). Future research should provide evidence of criterion-related validity of the scale. Concurrent data should be collected using other valid or legitimate measures of team functioning dimensions along with the Team Functioning Scale and the association between the scores and criterion investigated through correlation and regression techniques.

Discussion

The Team Functioning Scale is a reliable and valid scale that measures three domains of effective teaming: structure, communication and focus. Overall, teams that function at a high-level according to the Team Functioning Scale excel in focus and structure indicators, but are slightly weaker in the communication domain (e.g., communicate effectively, disagreements addressed, all viewpoints shared). Conversely, the lowest functioning teams reported low levels of implementation in indicators of focus and structure, as well as communication. Importantly, the TFS is sensitive and responsive to change over time, and as teams target areas for improvement, domain scores increase.

Using the Team Functioning Scale Results to Improve Teaming Practices

Results indicate that the Team Functioning Scale administration may be a mechanism to promote improved teaming in educational improvement teams. Team members who participate in discussion about the effectiveness of their team processes are more able to operate effectively as a team, and debriefing positively impacts team member attitudes (Eddy, Tannenbaum, & Mathieu, 2013). This process entails individual team members completing the scale by observing indicators of overall team functioning. Results are averaged and provided back to the team in summary format for personal reflection, team discussion and targeted improvement. After implementing strategies to improve teaming, the Team Functioning Survey can be re-administered to assess change in team functioning for each domain over time.

One example of using results for improvement occurred at a training in February 2014. Fourteen teams reflected on their Team Functioning Scale summary reports that provided means and ranges by domain and for each item. Discussion guides with open-ended response options provided feedback on the utility of the Team Functioning Scale. All fourteen teams were able to accurately identify strengths and areas of improvement for their team, directly related to the results on the Team Functioning Scale. Furthermore, each team identified a reason that it was important to improve their needed area of functioning. One team stated that they needed a “designated note-taker” because it would offer “clarity of what we have covered and assigning to dos.” Another team identified an area of need as “problem solving and working through disagreements” because they needed “to be constructive with difficult conversations.” The teams then identified actions their team would take to improve the area of need. Actions included changing meeting times, sharing data, improving email communication, and assigning roles.

When asked to finish the phrase, “It is beneficial to look at team functioning because...” each of the fourteen teams provided a positive statement, including (a) “using data allows us to identify areas of need and develop/implement and monitor success;” (b) “a well-functioning team is more efficient and productive;” (c) “it helps drive effective teaming structures which then ensures data-based decision making is happening rather than ‘admiring the problem;’” (d) “when a team functions effectively, the time used for teaming is not just wasted;” (e) “good team functioning supports continuous improvement for students and staff;” and (f) “the team drives the decision-making process for the whole district.” Clearly, educational teams found benefit in

reviewing TFS results and intermittent administration of the TFS is one mechanism to promote improved teaming in educational improvement teams.

The TFS does have limitations for use in improving team functioning. Principal Component Analysis revealed only two strong domains, with an Eigenvalue of less than one for the Focus domain, but the researchers chose to keep the three-domain structure because school teams reported that it aided in interpreting the results. Also, while significant improvements in team functioning across time were noted for the scale overall and for the Communication and Focus domains, these improvements only approached significance for the Structure domain ($p=0.065$). Additionally, it is not known how changes in team membership influenced the ratings across time. Additional research should continue to evaluate the construct validity, including repeated measures analyses to identify changes over time reported by individual team members, as well as address the criterion-related validity of the scale.

Implications for the Field

In contemporary K-12 education, interdisciplinary teams are a key component of education improvement initiatives, which entail diverse professionals working together in a team setting. Educational teams require team members who are peers to share expertise, responsibilities and improvement efforts. Furthermore, teaming appears to have a positive impact on collective values, beliefs, behaviors and norms, all of which comprise school culture (Stolp, 1994). School culture, in turn, is directly related to teacher retention and student academic achievement (Sherblom, Marshall, & Sherblom, 2006; Stolp, 1994; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). To this end, highly functioning school teams could be considered critical to implementation of any educational initiative or intervention.

If team functioning is critical and related to school culture, then poor teaming could be detrimental to improvement efforts and negatively impact student achievement. Novice teachers may have limited knowledge and experience regarding participating in educational improvement teams. Schools and districts cannot risk making assumptions about education professional's ability to team effectively; we must instead support educators to self-evaluate and apply the skills they need to build a high functioning team.

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