

**Developing Math/Science Teacher Leadership:  
A Consensus Approach to Evaluating Program Quality**  
Codebook, January 2016

The TLSYN project proposes to synthesize theory, research and practice on math/science teacher leadership development. The goal of this synthesis project is to establish consensus on the key attributes of teacher leadership development programs that are effective in preparing and supporting teacher leaders to positively impact math/science teaching and learning. The outcomes of the synthesis include a literature review of math/science teacher leadership development, consensus guidelines for quality math/science teacher leadership development programs, and recommendations for future research and practice in teacher leadership development.

GENERAL GUIDELINES FOR USE OF CODEBOOK

Purpose— This codebook was developed in order to guide the review of existing published research studies and programs on math and science teacher leadership development. This review will provide descriptive summaries regarding the state of the knowledge base for teacher leadership development so that a review of the knowledge can be generated and used to guide the development of project deliverables for the *Developing Math/Science Teacher Leadership: A Consensus Approach to Evaluating Program Quality* project (hereafter, TLSYN). The intent for this codebook is to provide a means of systematic review for key indicators which determine a study's or program's attribute findings related to the development of teacher leaders in math and science.

This TLSYN Codebook will be applied to studies and programs that meet the following eligibility:

Eligibility for Research Articles:

- Written in English
- Peer reviewed
- Math and/or science specific, includes engineering, technology and computer science
- Focus on teacher leadership preparation, learning, development, support
- Explicit teacher leadership topic or question
- Defined and bounded data set with an articulated procedure for data collection and analysis

Eligibility for Programs:

- Math and/or science teachers
- Extends beyond local level
- Within K-12 education
- Systemic approach
- Includes description of program goals, strategies, and outcomes
- Focus on teacher leadership preparation, learning, development, support
- Evidence of effectiveness, peer-reviewed research article, or external evaluation report

The TLSYN research questions that this codebook is intended to help us answer are:

- What patterns exist among attributes of math/science teacher leadership development programs?
- What patterns exist in how math/science teacher leadership development programs define and measure program quality?
- What evidence exists for the effectiveness of math/science teacher leadership development programs?

The purpose of applying the indicators outlined in this codebook to studies and programs is to identify the contribution(s) of each study/program to the field's knowledge base about teacher leadership development in math and science. Applying the indicators within this codebook is not intended to cast blanket "good/bad" or "in/out" judgments. Rather this codebook is meant to aid our understanding of the strengths and limitations of each study's or program's contributions to the knowledge base.

This codebook will not be used to code the quality of the evidence of effectiveness (i.e., the quality of sampling, instrumentation, chosen methods of data collection and analysis). Rather, the codebook will be used to code whether evidence exists and can be used to help inform work within teacher leadership development.

Establishing Eligibility—A published study or program will first be reviewed by BSCS or KSTF staff using the “Eligibility” protocol to record essential parameters of the study/program (e.g., does it meet the criteria for a further review?). If a study or program meets eligibility requirements, it will receive a full review using the indicators in this codebook. If a study or program does not meet eligibility requirements, it will be stored in a database that allows for easy retrieval if eligibility requirements change during the project.

Directions for Coding a Study or Program—A reviewer should have all of the relevant articles, documents, and reports for a given study or program prior to coding and access to the online TLSYN Coding Google Form (either for a published article or for a program). The indicators listed under each section should be thought of as a checklist of the things you should consider and/or describe. There is further description of each of these indicators contained in this codebook.

Before coding an article, read the article in its entirety. Read the PDF and mark the article as you go. Marking the article includes 1) highlighting key information and 2) adding a comment in the margin about what the information is. For example, when/if the coder finds the number of participants in each group, highlight the sentences that include the information and then in a comment, make the note, “Group Size.” Be sure to use a bright highlighting color so it is easy to see comments.

Before coding a program, create a PDF of program information/materials (from the website or brochures, etc.) and follow the instructions above for reading and marking the PDF as you go.

## Article Coding

**Documentation of Project Activities:** Describe the key elements of the study.

First include reviewer initials, citation and abstract, when available. Then, answer the following indicators:

<b>Indicator</b>	<b>Questions and guidance to consider</b>
1. Defining teacher leadership	<b>How do the author(s) define teacher leadership?</b>
2. Research questions	<p><b>Were the research question(s)/issues/factors being studied/hypotheses <i>clearly stated</i>? Yes/No</b>            In more exploratory studies the questions or issues may be less defined, but the reader should still be able to determine the purpose of the study without prior knowledge of the study, or substantial background knowledge of the topic.</p> <p><b>If Yes: What were the research question(s)/issues/factors being studied?</b>            Do the research questions/issues/factors being studied align with TLSYN research questions?</p>
3. Type of Study	<p><b>What type of study design was employed?</b>            Choose: Quantitative or Qualitative or Mixed Methods            If Quantitative, choose: Experimental, Quasi-Experimental, Correlational,            If Qualitative, describe briefly methods (e.g., grounded theory, case study)</p>
4. Research site	<p><b>Were the research sites <i>sufficiently described</i>? Yes/No</b>            Were the location(s) where the research took place sufficiently described given the nature of the study? Sufficient description includes stating things like the demographics of the community or school setting such as size, socioeconomic status, geographic location, financial resources, etc.</p> <p>If Yes: briefly describe the research site.</p>
5. Sample demographics	<p><b>Were the research samples <i>sufficiently described</i>? Yes/No</b>            Was relevant information about the sample provided on characteristics likely to relate to the research questions and contexts (such as years of experience of teachers, SES of the participants, gender, etc.)?</p> <p>If yes, briefly describe the research sample (i.e., how would you characterize the teachers?)</p>
6. Interventions and Implementation	<p><b>Were the educational interventions, if applicable, being studied <i>clearly described</i>? Yes/No</b>            Was there sufficient description of the components, both theoretical and practical, of the intervention (i.e., leadership development)? Were the interventions for the treatment groups of interest as well as any comparison groups described? Potentially important information about the implementation of the intervention includes who delivered the intervention, the dosage and duration of the intervention treatment and comparison treatments, and fidelity to original intervention design, the activities, strategies or other foci of the program.</p> <p>If yes, briefly describe the intervention or “treatment” including how the treatment was delivered/implemented</p>
7a. Data collection	<p><b>Were the data collection strategies <i>articulated</i>? Yes/No</b>            Was there sufficient information to determine what data collection strategies were employed, by whom, and when—relative to the intervention?</p>

	If yes, briefly describe the data collection approach.
7b. Instruments	<b>List the instruments used in the study.</b>
7c-e. Data analysis	<b>Were the data analysis methods articulated?</b> Was there sufficient information to determine what data analysis methods were employed, by whom, and for what purpose? Coding process, reliability and validity, etc.?  If yes, briefly describe the data analysis.
8. Findings related to the attributes of teacher leadership development	<b>What findings did the study have that are related to the development of math/science teacher leadership?</b> Summarize the findings of the research that are related to attributes of teacher leadership development, such as findings about the context, the intervention, or the characteristics of teachers. This indicator will be coded again to establish patterns across research and programs. Did the study report evidence of effectiveness, and what program attributes did the research recognize as contributing to this effectiveness?
9. Limitations Presented	<b>Were the study's limitations presented?</b> Is there clear indication that the author is cognizant of major limitations of the study by stating anything that would severely limit the utility/generalizability/trustworthiness of the findings?  If yes, note the limitations.
10. Generalizable to additional contexts	<b>Given the context in which the study was carried out, could the findings be informative to other contexts?</b> Were the sample and study context adequately described and appropriately selected to provide some confidence that the study would be representative of different contexts?  If yes, describe the generalizable nature of the findings to a different context.
11. Important references for the TLSYN work	<b>Note any specific foci of the study that seems particularly relevant to the TL synthesis work.</b>
12. Important quotes, takeaway messages, etc.	<b>Note important quotes from the authors, important takeaways messages, and big ideas to characterize the study in the TL landscape.</b>

## Program Coding

### Adequate Documentation of Project Activities.

First include reviewer initials, program name, years in operation, and list materials that were reviewed. Then, answer the following indicators:

Indicator	Questions and guidance to consider
1. Define teacher leadership	<b>How does the program define teacher leadership?</b>
2. Program Goals	<p><b>Were the program goals <i>clearly stated</i>? Yes/No</b>            Teacher leadership programs in math/science should clearly state the goals of the leadership development program. These could be stated with the program materials, website, or other program documentation.</p> <p>If yes, briefly describe program goals. Do the program goals align with TLSYN project goals?</p>
3. Program site	<p><b>Was the program site <i>sufficiently described</i>? Yes/No</b>            Were the location(s) where the program took place sufficiently described given the nature of the program? Sufficient description includes stating things like the demographics of the community or school setting such as size, socioeconomic status, geographic location, financial resources, etc. – if applicable.</p> <p>If yes, briefly describe program site(s)</p>
4. Participant demographics	<p><b>Were the participants <i>sufficiently described</i>? Yes/No</b>            Was relevant information about the program participants provided? How are the participants recruited? What prerequisite knowledge or skills in necessary?</p> <p>If yes, briefly describe participants.</p>
5. Program description	<p><b>Is the program itself <i>clearly described</i>? Yes/No</b>            Was there sufficient description of the components of the program? What is the experience like for the participants? How many contact hours do they have, in what mode of delivery, covering what topics? Is there a follow-up as part of the program?</p> <p>If yes, briefly list the program components</p>
6a. Data collection and analysis	<p><b>Is any data collection and analysis <i>articulated</i>? Yes/No</b>            Is there sufficient information to determine what data collection methods were employed, by whom, and when–relative to the program? Also, is there any information about data analysis methods?</p>
6b. Instruments	<b>List the instruments used by the program.</b>
6c. Evidence of effectiveness	<b>List the evidence the program makes available about its effectiveness.</b>
7. Findings related to attributes of teacher leadership development	<p><b>What findings does the program have related to the development of math/science teacher leadership?</b>            Summarize the findings of the program that are related to attributes of teacher leadership, such as findings about the context, the program intervention, or the characteristics of teachers. This indicator will be coded again to establish patterns across research and programs.</p>
8. Generalizable to additional contexts	<p><b>Given the context in which the program was carried out, could the findings be <i>informative to other contexts</i>? Yes/No</b>            If yes, describe how it might apply to other contexts.</p>