

Session Number: 14

Abstract Name: **An Evolutionary Case Study of Using Theory-Based Evaluation in a Math and Science Partnership Project**
MSP Project: Rocky Mountain Middle School Math Science Partnership
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1. Questions(s) or issue(s) for dialogue at Learning Network Conference session:

Callow-Heusser, Chapman, and Torres (2005, April) published a guide titled “*Evidence: An Essential Tool – Planning for and Gathering Evidence Using the Design-Implementation-Outcomes (DIO) Cycle of Evidence*” which was funded by the NSF specifically to help projects soliciting funding, or with existing funding under the NSF’s Math-Science Partnership program. One of the most salient recommendations in this guide was for project evaluators to use logic models to help guide evaluative efforts. Theory-based evaluation (TBE) is an evaluative technique that takes the graphical representation of a logic model and elaborates how to conduct both implementation fidelity evaluation and impact evaluation using the logic model’s explicit chain of reasoning.

The issue for dialogue here, then, is an opportunity to discuss an NSF-supported form of program evaluation that has evidence-based capacity.

2. Context of the work within the STEM education literature and within your MSP project:

Theory-based evaluation (TBE) has been explicated for over the past two decades as an evaluation model to assess how a program will work under certain conditions to solve identified problems (c.f. Chen, 1990; Weiss, 1998), and supported more recently as a viable, evidence-based option in cases where randomized trials or high-quality quasi-experiments are not feasible (Weiss, 2002). Theory-based evaluation is an approach to evaluation that requires surfacing the assumptions on which the program is based in considerable detail: What activities are being conducted? What effect will each particular activity will have? What should the program do next? What should be the expected response to what happens next? and so on, to the expected outcomes. The evaluation then follows each step in the sequence to see whether the expected mini-steps actually materialize (Birckmayer & Weiss, 2000). In other words because the data collection points are shorter and occur more often, theory based evaluation can not only provide information about each link in the chain but the connections between those links as well.

This presentation was developed as a result of a re-direction of our MSP project in Years 3 and 4 of our project. We decided we needed to move to a research/evaluative framework that would allow us to explore what we believed to be the most important implementation and impact evaluation questions for our project. The TBE framework served that purpose well and this presentation will share our insights about its functioning.

3. Claim(s) or hypothesis(es) examined in the work (anticipating that veteran projects will have claims, newer projects will have hypotheses):

Our claim is relatively simple. We believe that many MSP projects have neither the capacity nor the research context to allow for randomized control trials to assess the effects of professional development interventions on both teachers and their students. Yet many of the MSP's have a direct interest in exploring such causal connections. Additionally, because many of the MSP professional development projects are delivering PD that is complex, hierarchical, menu-driven, time-extensive, and theoretically under-developed in terms of their empirical bases, we believe theory-based evaluation provides a well-established form of disciplined inquiry that is uniquely well-suited for this type of evaluative work

4. Evaluation and/or research design, data collection and analysis:

The presentation we will be giving participants at this session will give insights as to how to use TBE for MSP projects. In particular, we will discuss such issues as combining (and separating) research and evaluation activities, establishing question-driven research and evaluation, linking research and evaluation questions to the theory of change implicit in a logic model, and designing research and evaluation activities to assess linkages in the logic model. This discussion will be based on our own case example.

Our project began, as many large-scale professional development projects often do, with a primary focus on delivering the PD program and assuming that the external evaluation activities would satisfy both research and evaluation requirements of the project. We envisioned formative and summative functions of evaluation, developed both formative and summative evaluation questions, and built a strategic plan to address them. Our first two years resulted in fairly traditional evaluation reports of both our formative and summative evaluation work. With input from a variety of sources at the end of the second year of the project, however, we recognized that our external evaluation efforts simply were not giving us the most important, substantive information that we wanted from our work. Our own internal analysis suggested that we needed to re-think how we viewed the nexus of research and evaluation for our project due to three key conclusions:

1. Despite the fact that our MSP was a research project, we had focused more on implementation than on research, and we needed to make research much more central to our management discussions and project functioning and not delegate this functioning to an external evaluation in a traditional role as “evaluative.”
2. The most important and substantive questions we needed to be addressing in our work needed to be theory-driven and intervention-assessment oriented rather than project goal-driven and project-accountability driven.
3. While our original assumption of combining research and evaluation in our project was still a workable notion from a management/administrative perspective, the “external

evaluation” of our project was actually very limited in scope – centering largely on assuring timely and efficient project functioning and accountability.

When we moved our project orientation to align with these conclusions, we found that theory-based evaluation was exactly the framework we needed to go forward.

Our next project step was to set aside our evaluation strategic plan completely and complete the difficult work of building our theory of action for our project. Because this effort was inserted in the middle of an ongoing project it had to simultaneously reflect our actual PD work and drive a research and evaluation agenda that served to fill in important empirical gaps in the knowledge base on the effects of an inquiry-based PD intervention on both teachers and their students. The result of this work was a logic model – a graphical representation of our theory of action.

Our final step in the evolution from a traditional external evaluation to our TBE was to build a research and evaluation strategic plan that had its questions driven by the assumptions underlying the components and chronological/causal flow in the logic model. This strategic plan was then more fully elaborated with methodological plans for assessing each of these questions in scientifically valid ways. The nature of our questions varied greatly. Some were psychometric when we could not find adequate instrumentation to assess the constructs in our work. Some were purely descriptive when we needed to answer “why” and “how” questions about the PD intervention. Some questions were correlational when we were strictly interested in understanding bivariate relationships between and among constructs in our logic model. And ultimately we had causal questions about the PD and what its effects were on teachers and students.

5. Key insights (retrospective for veteran projects, prospective for newer projects) that have value for the Learning Network:

Three key insights are:

TBE helps clarify the lines of distinction between research and evaluation by focusing attention on conduct and function of these two types of activities. In our project we came to realize that much of the separation of research and evaluation early in our project was arbitrary and mis-directed.

TBE helps focus attention on the most important questions that need answering and helps program personnel eliminate research and evaluation activity focused on questions that are essentially unanswerable, marginally tangential to the central purpose of the project, theoretically irrelevant, or too expensive and/or time consuming to take on. The key here is that the use of TBE “framework-building” activities directs project leadership to center their limited research and evaluation resources on the most important work of their project.

TBE also requires program designers to be explicit about the central components of the PD intervention, thereby enhancing consistency and clarity of PD delivery across multiple recipients,

and to be equally explicit about the nature of the impact measures to be adopted, thereby clarifying measurement, design, and data collection issues and difficulties.

These insights and others will be the primary focus of the presentation.