Defining Domains of Coaching Knowledge Using a Modified Delphi Process

John Sutton, RMC Research Corporation

American Evaluation Association
San Antonio, TX November 13, 2010

Research Partners

Funding By The National Science Foundation Discovery Research K-12 Program (DR K-12), Award No. 0918326
Contributors and Other Personnel

Montana State University
- David Yopp, PI
- Beth Burroughs, Co-PI
- Jennifer Luebeck
- Mark Greenwood
- James Burroughs, Project Director

RMC Research
- John Sutton, Co-PI
- Clare Heidema
- Arlene Mitchell
- Lyn Swackhamer

Funded under NSF Award No. 0918326. Any opinions expressed herein are those of the authors and do not necessarily represent the views of the National Science Foundation.
Paper Presentation Outline

- Examining Mathematics Coaching (EMC) Project Description
- Modified Delphi Process
  - Participants
  - Questions Used by Phase
  - Rating System
- Definitions of Coaching Knowledge
Mathematics Coaching

Mathematics classroom coaching is gaining popularity as a school-based effort to increase teacher effectiveness and student achievement.
Mathematics Coaching Defined

“A mathematics coach is an on-site professional developer who enhances teacher quality through collaboration focusing on research-based, reform-based, and standards-based instructional strategies and mathematics content that includes the why, what, and how of teaching mathematics.”
Knowledge Domains

- Mathematics Content Knowledge
- Coaching Knowledge
- Knowledge of Teacher Learning
- Knowledge of Student Learning
Why Study Coaching?

- There is limited understanding of coaching effectiveness, especially in mathematics.
- Moreover, no studies have demonstrated what types and depths of knowledge effective coaches hold.
- At the same time, implementing coaching involves considerable cost and logistical effort for schools and districts.
Delphi Study

- Research method that uses a panel of experts to bring a field to consensus around a particular topic and enhance decision making.
- Used both in the corporate world and in education.
- It is acknowledged that “there are multiple variations of the Delphi Method” (Chamberlin, 2008, p. 3)
Delphi Study

- Non-geographically constrained, collaborative, structured learning exercise
- Allows access to all data generated with the opportunity to review, react, and refine while collaboratively engaged in the process
- Encourage experts to share viewpoints
Modified Delphi Study

- Tailored to meet the project’s research objective of identifying as many domains of coaching knowledge as emerged from the data
- EMC researchers provided panelists data that was filtered through a process of qualitative analysis conducted by researchers
- Used technology to bring together a panel of experts in a three-phase dialogue over time
Modified Delphi Study

- Three phase process:
  - *Phase I*: Identification – Identify knowledge areas;
  - *Phase II*: Elaboration– Define knowledge areas; and
  - *Phase III*: Validation – Validate the knowledge areas and definitions
Modified Delphi Study

- Participants
  - EMC researchers identified 10 experts in the field of mathematics coaching
  - Experts were invited to name two others who possessed the expertise to participate on the panel
  - The final panel consisted of 12 participants.
    - six are authors or co-authors of coaching or mathematics coaching books;
    - four are directors of grant-funded professional development projects on mathematics coaching;
    - one is a mathematics coaching practitioner; and
    - one studies coaching as a researcher in mathematics education.
Modified Delphi Study

Process

- engaged panel members in three phases over 18 days (October 1–18, 2009)
- All of the panelist interactions were blind (3-digit identifier)
- Panelists did not interact directly with each other
- EMC researchers did not know the authorship of panelist contributions
- All contributions were text-based, online submissions
Modified Delphi Study

Phase 1: Identification – Identify knowledge areas (N=12)

- think only about components of coaching knowledge, separate from teaching knowledge, that a coach needs in order to be effective
- identify and provide words or phrases that convey or represent your understanding of components of coaching knowledge.
Modified Delphi Study

- **Phase II: Elaboration – define knowledge areas (N=9)**
  - Research team used qualitative methods to list, cluster, analyze and organize responses, resulting in the identification of seven specific knowledge areas
  - Define each of the seven knowledge areas
  - Limit each definition to 100 words or less
Modified Delphi Study

**Phase III: Validation – Validate the knowledge areas and definitions (N=10)**

- Review the definitions for each of the seven knowledge areas
- Choose the degree with which you agree or disagree with four statements about the definition by using a five-point scale
- Following each definition are four optional questions related to the definition
Modified Delphi Study

- **Phase III: Validation** – Validate the knowledge areas and definitions (N=10)
  - Rating Scale
Modified Delphi Study

- **Phase III: Validation – scaled questions**
  - This is an accurate definition for coaching knowledge of …
  - This definition captures my thinking related to coaching knowledge of …
  - This definition enhances my thinking related to coaching knowledge of …
  - This definition can help inform my work.
Modified Delphi Study

- **Phase III: Validation – Open questions**
- What words, phrases or key features for the definition (if any) ...
  - do you feel are missing and need to be considered for inclusion in the final definition?
  - do you feel are particularly unclear and need to be restated to minimize confusion or misunderstanding?
Modified Delphi Study

- **Phase III: Validation – Open questions**
  - What (if anything) do you feel could or should be removed from the definition?
  - What other comments or suggestions do you have to enhance the overall quality and utility of the definition?
Results

- Eight domains of coaching knowledge were identified by EMC researchers in Phase I.
- Domain and definition of knowledge of communication was consistently and sufficiently identified and defined by panelists in phase one.
Coaching Knowledge

- Relationships
- Communication
- Leadership
- Assessment
- Student Learning
- Teacher Practice
- Teacher Learning
- Teacher Development
Results

- From Phase III, there was a high level of agreement and high level of consensus among panelists for scaled response questions.
- EMC researchers conducted a review of the additional comments from open-ended questions.
Results

- Based on additional comments, and EMC specific needs, EMC Researchers revised the definitions in the seven domain areas.
- Reflected the EMC researchers’ knowledge while considering the panelists’ comments.
Results

- Eliminated laundry lists, eliminated the ambiguity in wording between skills, practices, and beliefs, and framed the definitions in terms of knowledge.
- Some ideas were moved from one domain to another.
- Filtered based on what a coach needs beyond what a teacher needs.
Use of Definitions

- Guide instrument development
- Encourage other projects and institutions to use these definitions provided as a starting point
- Feel empowered to modify any of the definitions to fit specific project context and needs
Contact Information:
John Sutton, sutton@rmcdnver.com
Phone: (800) 922-3636
Web: www.math.montana.edu/~emc/