What Can Mixed Methods Designs Offer Professional Development Program Evaluators?

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Abstract

In this paper, the authors describe the benefits and pitfalls of mixed methods designs. They argue that mixed methods designs may be preferred when evaluating professional development programs for p-K-12 education given the new call for accountability in making data-driven decisions. They summarize and critique the studies in terms of limitations of the studies, the measures utilized in the mixed methods design (quantitative and qualitative measures), and the overall analysis of the impact of this body of literature. Implications for researchers who want to apply mixed methods designs and evaluators who want to influence professional development planning will be outlined.

Professional development is a critical component of schooling in the 21st century. In fact, the current demand for teachers to change their teaching practice is mediated by apparently conflicting mandates. For example, NCLB requires that states provide "high quality" professional development for all teachers but does not specify what constitutes high-quality professional development. The assumption underlying professional development activities is that teachers learn as a result of participating effective professional development. Effective professional development leads to changes in teachers and consequently changes in student performance and achievement. Successful professional development, therefore, implies documentation of changes in teacher skills, attitudes, dispositions, and student performance in grades p-K-12.

Despite what has been learned about how teachers learn, professional development appears to be inadequate given the limited research on effectiveness. In fact, although we know that professional development has the *potential* to impact student learning, we do not know what and how teachers learn from professional development or the impact of teacher change on student achievement (Borko, 2004). Moreover, the demands for school systems to be accountable for student achievement engendered by No Child Left Behind has resulted in a plethora of state-wide assessment systems whose data itself is called into question (Foote, 2007). From her vantage point in the role as director of research for the New York Performance Standards Consortium, Ms. Foote cogently questions the assumptions underlying state-wide mandated assessment procedures and poses an alternative way to judge the quality of a student's education. However, in an essay published in the January 2007 issue of the *Phi Delta Kappan*, even the eloquent

Ms. Foote fails to mention the responsibilities inherent in being accountable to professional development program effectiveness.

These provide good reasons to develop solid research agenda to document effectiveness of professional development in America's schools. Towards that end, what are the characteristics of effective professional development? The American Educational Research Association (2005) recommended that effective professional development has focus (e.g., on subject matter and student learning; links to curriculum materials teachers use as well as state and national standards, assessment and accountability systems; is experienced and sustained over time; and involves a significant number of hours. The elements to study when determining effectiveness of a professional development program were also articulated (AERA, 2005), including teachers (the learners), the facilitator (the guide for the teachers), and the context in which professional development occurs. Borko (2004) suggests that professional development be studied at several levels such as a single program at single site, a single program at multiple sites with multiple facilitators, and multiple programs at multiple sites with multiple facilitators (with this level representing the gold standard of generalizability). Most states and school districts do not have such systematic evaluation systems in place, even though there is general agreement that a good evaluation plan involves a comprehensive examination of classroom practices, includes an assessment of the impact on teachers' behavior, and extends the documentation of impact to effects on student learning. Moreover, the systematic evaluation plan will be ongoing, incorporate beginning the assessment process at the beginning of the professional development program and continuing until beyond the completion of the program.

In order to study all of these elements using recommended guidelines, a mixed method approach is desirable. The National Staff Development Council (NDSC) (2006) recommends using multi-modal approaches and multiple sources of information to evaluate professional development including an assessment of the impact on student learning

> *Multiple data sources is the preferred method to make data-based decisions regarding what professional development should be offered and how it should be developed and delivered* (NDSC, 2006, p.)

Rationale

How can evaluators make more informed data-driven decisions regarding the impact of professional development programs in p-K-12 educational settings? We argue that one way to study how staff development improves the learning of students can be found in mixed methods research designs (Collins, Onwuegbuzie, & Sutton, 2006; Creswell, 2003; Creswell, Shope, Clark, & Green, 2006; Tashakkori & Teddlie, 1998; 2003).

Method

The authors conducted a search of literature on mixed method studies in professional development. Database sources included ERIC, PsychoInfo, Dissertation Abstracts International, and footnote tracking. The search included the following key words: *evaluation, mixed methods designs, staff development, professional development, inservice, k-12 schools, impact on student learning*. Other data bases for medical education and nursing and human resource development were also searched. The boundaries included journal publications and the years 1995-2007 (note: 1995 was

selected because it was the first year that national standards for staff development had been articulated). The articles that emerged were read and evaluated into categories, such as theoretical, empirical, or expert opinion. In this paper, the authors focus only on results of the empirical studies that have been published within the last 5 years (2002-2007) in order to provide the most comprehensive analysis of mixed methods designs in professional development.

Results

The results yielded fewer than 14 empirical studies wherein the researchers used quantitative and qualitative analyses to assess the impact of a p-K-12 professional development program in American schools. Table 1 provides a brief summary and critique of the 14 studies, including names and year of the publication, the publication venue, the discipline or content area of the professional development program, the type of mixed method design, measures utilized in collecting both quantitative and qualitative data, and limitations.

Insert Table 1. Empirical Studies (2002-2007)About Here

As can be seen by inspection of Table 1, 11 researchers started with a quantitative approach followed by the qualitative methods. When considering the rich array of choices available to mixed methods researchers (see typology created by Tashakkori & Teddlie (1998; 2003), this was a surprising result and may be an indicator of the lack of sophistication and experience with mixed methods on the part of professional development evaluators.

Most researchers within these 14 studies collected and reported measures of changes in teachers' behaviors. However, only four included documentation of changes in student achievement (e.g., Heneman & Milanowski, 2004; Van Hanegham, Pruet , & Bamberger, 2000; and Vasquez, 2003). This, too, is a surprising result given the fact that the NSDC Standards for Professional Development Evaluation which describes the "gold standard" for determining effectiveness of professional development programs had been disseminated since 1999.

Discussion

Given the limited number of examples of empirical studies where researchers used multiple methods to analyze the impact of professional development programs including measures of changes in teacher performance as well as p-k-12 pupil achievement, and given the limitations noted in every study, why do the authors continue to recommend that mixed methods be used?

First, our readings of the power of mixed methods (e.g., Creswell, ; Tashakkori & Teddlie, 1998; 2003) remind us that several benefits accrue. For example, mixed methods approaches can address research questions other methods, when used alone, cannot. Mixed method studies can more clearly represent divergent views (see studies enumerated in Table 1 in which researchers tapped typically marginalized stakeholders such as Van Henegham et al., 2000 inclusion of children in k-5 grades. Mixed method designs can extend quantitative data and answer research questions that otherwise are left unanswered.

Second, the authors recently completed two studies where they used mixed methods to track teachers' changes in a) teaching behavior through survey and

observation, b) attitudes towards the inservice content through interviews, and c) generating an hypothesized model or testing the validity of a professional development model (Cramer & Nevin, in press; Giordano, 2004; in press). Table 2 depicts two different visual representations of the researchers' sequence in implementing a model development, implementation, evaluation, and model evaluation mixed methods study (Giordano, 2004; in press) and Cramer & Nevin's (in press) sequence of generating research questions suitable to both quantitative and qualitative methodologies, then implementing first the quantitative phase, then the qualitative phase, and the final synthesis of findings derived from both phases.

Insert Table 2. MIXED METHOD DESIGNS: Two Recent Studies

As can be seen from an inspection of Table 2, Giordano (2005) first conducted an extensive literature review from which a theme analysis yielded the principles of effective professional development. This led to the articulation of the Giordano Professional Development Model. Then the researcher collected quantitative data that included measures of teachers' change in concerns about their using the innovation and qualitative data from interviews. The qualitative phase of interviews pre-post-follow-up then followed. Theme analysis of the rich descriptive text of teachers' perceptions resulted in an assessment, in the teachers' voices, of the model which emphasized several features derived from theories of adult development and the value of collaborative authentic inservice training which occurs over extended periods of time. Cramer and Nevin (in press) generated research questions that reflected the need for both types of

methodologies. They collected quantitative data on measures of teacher attitudes and beliefs toward co-teaching and qualitative data from interviews that allowed their attitudes and beliefs about co-teaching to be validated with the survey outcomes. Furthermore, observations of the co-taught lessons anchored the beliefs and attitudes in actual practice. Outcomes were obtained for both studies that one method alone could not have generated. For example, in the Giordano study, the combination of control group (post inservice completion of surveys by experimental teachers, those who participated in the inservice to learn the innovation, and a matched sample of teachers with similar years of experience and grade level who did not participate in the professional development program) and mixed methods design combined to form a powerful case for validation of the professional development model itself.

In summary, these experiences combined with our immersion in the literature on mixed methods have convinced us that it is worth the effort to design and implement mixed methods designs in spite of the fact that to do so requires a complex repertoire; that is, the evaluator must learn both quantitative and qualitative methods. It requires understanding both quantitative and qualitative data analysis and interpretation. It demands that research questions and contexts must reflect need for mixed methods. However, the major benefit is that outcomes yield richer and deeper understanding of the impact of professional development.

Implications

We believe that the results of the review of the literature on mixed methods in professional development provide a strong case for selection of mixed methods as n evaluation framework. In this section, the authors pose several directions for planners,

trainers, and evaluators who, we believe, must take into consideration multiple factors within their context; for example, their expertise, time available, and resources at hand, However, we believe that when planners, trainers and evaluators complete the *Specify* → *Clarify* → *Diversify* → *Celebrate* , they will gain the benefits that mixed methods promises to those who want to use data-based decision making procedures for professional development activities.

Insert Table 3 Specify → Clarify → Diversify→ Celebrate About Here

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Planners, trainers, and evaluators can specify questions that require a mixed method approach to resolve and they can specify the quantitative and the qualitative measures they will collect to address those questions. Planners, trainers, and evaluators can clarify a timeline which prioritizes the approach to data collection (e.g., will both quantitative and qualitative data be collected concurrently or sequentially? They can create multiple visual diagrams of the plan so as to communicate to various stakeholders. Planners, trainers, and evaluators can diversify data sources, data collection, data analysis, and data interpretation to impact. They can distribute the responsibilities to those who implement the professional development (trainers), those who receive the professional development (trainees—teachers), and those whose lives are affected (the p-K-12 children and youth, and their families).

In conclusion, we are reminded of the complexities of our natural world. For example, the Double Helix reveals. We share one of the images of the double helix structure of the DNA molecule (Retrieved January 29, 2007 from

http://academy.asd20.org/kadets/lundberg/dna.html) to remind us that the complexities of the DNA molecule were revealed by scientific inquiry, model development, and empirical studies. When a complex image is uncovered in the natural world, we can hypothesize that double helixes may be helpful representations of the complexities of human social interactions such as those that occur in professional development. We look forward to the new discoveries that await us when complex research designs are applied to professional development activities.

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Table 1: 14 Empirical Studies (1999-2007)

Author (Date)	**Publication Venue**	**Discipline**	**MM Design**	**Measures**	**Limitations**
Cramer & Nevin (2007)	*Teacher Education Special Education*	Inservice Education	QUAN→ QUAL	Survey Ratings on Two Scales Follow up Interviews with Volunteers Classroom Observations	No measure of k-12 pupil changes No control group
Giordano (2007)	*Computers in the Schools*	Inservice Education Technology	QUAL→ QUAN→ QUAL	Theme analysis of Lit Review→Model Development QUAN→Hall & Hord CBAM Levels of Use & Stages of Concern Questionnaire QUAL→Teacher Perceptions (verbatim text analysis of interviews) on Impact of the SD Model	No measure of k-12 pupil changes
Heitman (2006)	DAI, Fordham	School District Math Standards Implementation Project (Policy Analysis) – Impact of NY State Math Standards	QUAN→ QUAL analysis of single year vs multi year participation	Survey instrument Focus Group Interviews *NY Math Assessment data (grades 4 & 8)	No control group
Heneman & Milanowski (2004)	*Peabody Journal of Education*	Human Resource Management Practices & Teacher Performance	QUAN→ QUAL	Measures of HR practices in place in 2 county's school districts Measures of Teacher Competency	No control group

		Competency Aligned with Student Achievement		Measures of Student Achievement Qualitative analysis of how much alignment was in place	
Lewandowksi (2003)	DAI, Indiana University of Pennsylvania	Educational Psychology (Self-Efficacy)	QUAN→ QUAL	Personal Self Efficacy Scores on Woolfolk & Hoy (1993) *Teacher Efficacy Scale* Scores on Leithwood (197) *Nature of School Leadership* questionnaire Follow-up interviews with subset of teachers	No measures of k-12 pupil changes No control group
Liston (2005)	DAI, Argosy	Inservice Staff Development, Inclusive Education	QUAL→ QUAN	Hall & Hord CBAM Levels of Use & Stages of Concern Q + Teacher Perceptions on Impact of Model	No direct measure of pupil changes No control group
Moore (2005)	*International Journal of Mathematical Education in Science and Technology*	Constructivist Student centered (collaborative learning) impact on Undergraduate Math Education & Achievement of Ethnic Minorities in an Engineers Program	QUAN→ QUAL	Achievement of target group with matched control group of ethnic minority calculus students (GPA, Grades in Course, Failure/withdrawal rates) Voices of the student participants elicited through comparing written course evaluations of target group with matched control group of ethnic minority calculus students	No 'treatment integrity' measure of the extent to which faculty actually taught differently (the calculus course within a constructivist collaborative learning framework vs faculty who taught the control group calculus course)
Muijis,	*Journal of*	Leadership and	QUAN→	Survey	No direct measures of

Harris, Lumby, Morrison, & Sood (2006)	*Further & Higher Education*	leadership development for 'highly effective' inservice providers	QUAL	Focus group interviews Individual interviews	leadership actions No measures of k-12 pupil achievement
North (2004)	DAI, University of Alabama	Effective Teaching (Community College Faculty)	QUAN→ QUAL	Survey using Roueche,Roueche, & Milliron (2003) *Five Star Faculty Survey* Online Chat Sessions and F2F Focus Group Interviews	No direct measures of college student achievement of faculty with positive perceptions vs less positive perceptions
Nimkoff (2005)	DAI, UNC Chapel Hill	K-12 Teacher Implementation of Program for Students with Learning Difficulties	QUAN→ QUAL	Hall & Hord CBAM *Levels of Use* (LoU) web-based survey Telephone Interview to assess impact longitudinally	No measure of k-12 pupil changes
Schoech & Helton (2002)	*Qualitative Social Work*	Course delivery (distance ed/online combined with traditional campus based)	QUAN→ QUAL	Qualitative measures analyzed with NUD*IST Quantitative measures analyzed with SPSS Graphic analysis of 'online chatroom' text	No control group
Van Hanegham, Pruet, & Bamberger (2000)	*Journal of Education for Students Placed at Risk*	Math standards reform (notably: (a cognitive constructivist perspective on math learning)	QUAN→ QUAL	TIMSS data set Stanford Achievement Test-9 percentile scores Teacher Performance measures evolving from Project IMPACT Project generated interviews with K-	No treatment integrity measures to verify that teachers were actually using the cognitive constructivist pedagogy

				2 students (6 per class within each of x schools) or randomly chosen groups of students in grades 3-5.	
Vasquez (2003)	*Science Educator*	Science Education & Science achievement of students considered at risk for school failure	QUAN→ QUAL Case Study	Measures of St. Louis Public Schools students (81% African American; 82% low SES) on two achievement categories (achievement gap associated with race/ethnicity is being closed) for Grade 3 science Interviews with multiple stakeholders during each phase (planning and implementation) Progress Monitoring (periodic review and feedback) of Selection of Curriculum Scope and Sequence & Program Implementation	No specific measures of changes in teacher behaviors in classroom instruction (content or process)
Womack (2004)	DAI, Auburn	Staff Development Standards & Staff Development program to influence teacher performance so as to increase Student Achievement in Russell County Schools	QUAL→ QUAN	Qualitative measures of program implementation→identified high vs low quality programs Teacher Performance (changes in instructional behaviors that increase academic performance in the teaching of writing) Student Achievement (writing)	No control group

Table 2. Visual Representation of Giordano (2005) SEQUENTIAL QUAL-QUAN-QUAL Design

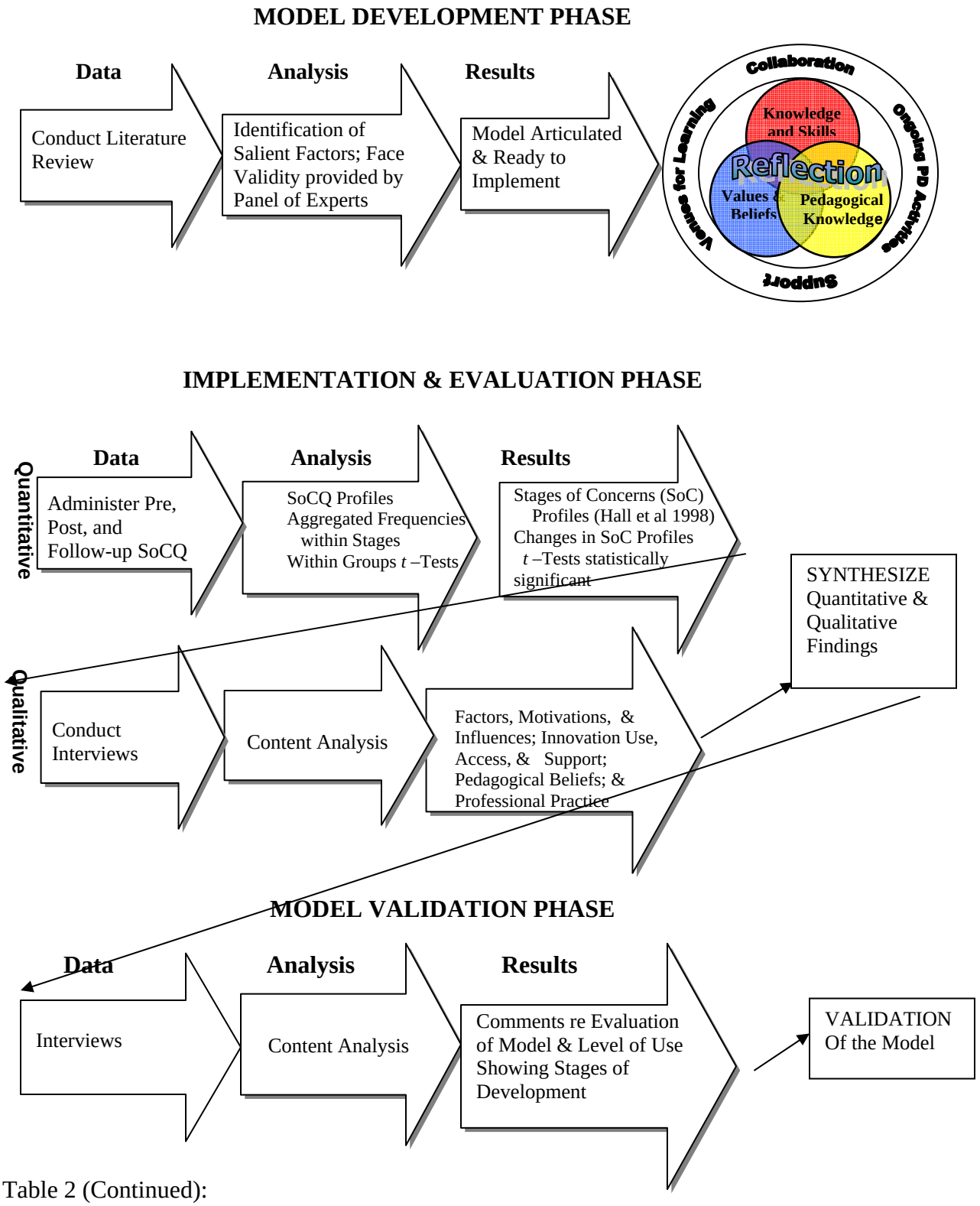


Table 2 (Continued):

Visual Representation of Cramer & Nevin (in press) SEQUENTIAL QUAN-QUAL Design

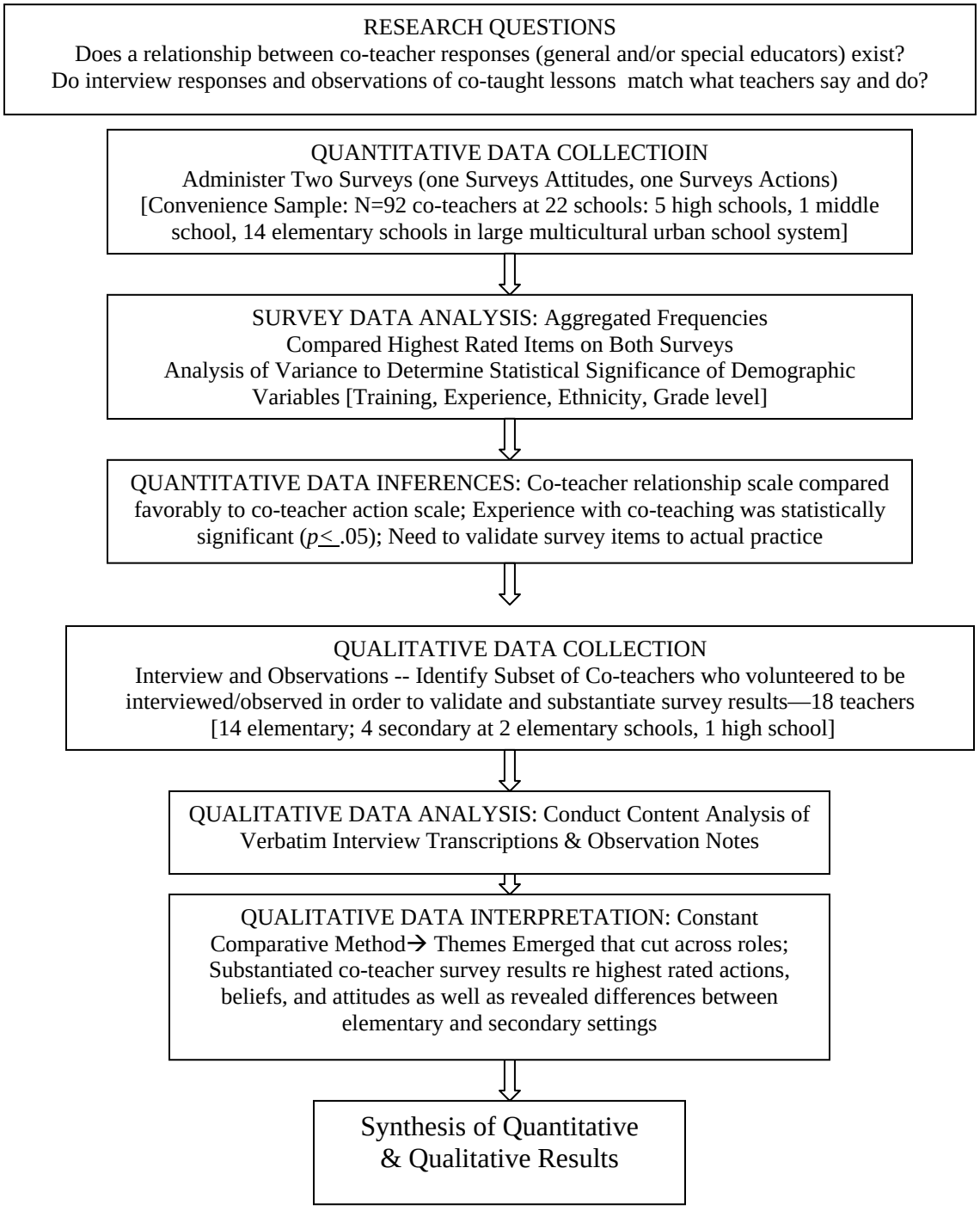


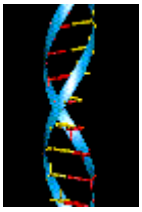
Table 3

Recommended Steps for Professional Development Program Planners, Trainers, and Evaluators

Specify →	Clarify →	Diversify →	Celebrate Multiple Outcomes
Questions that require a mixed method approach Quantitative and qualitative data to collect	Create a timeline and priority of the two approaches (Concurrent? Sequential?) Create a visual diagram of your plan	Data sources Data collection Data analysis Data interpretation	Those who implement the professional development (trainers); Those who receive the professional development (trainees—teachers); Those whose lives are affected (the children and youth and their families), the Community, Administration, Funding Agents, etc.

Figure 1

Image of the Double Helix Structure of the DNA Molecule



*Retrieved January 29, 2007 from http://academy.asd20.org/kadets/lundberg/dna.html