

Beyond Fidelity: Relating Educational Practices and Their Determinants to Student Learning Gains

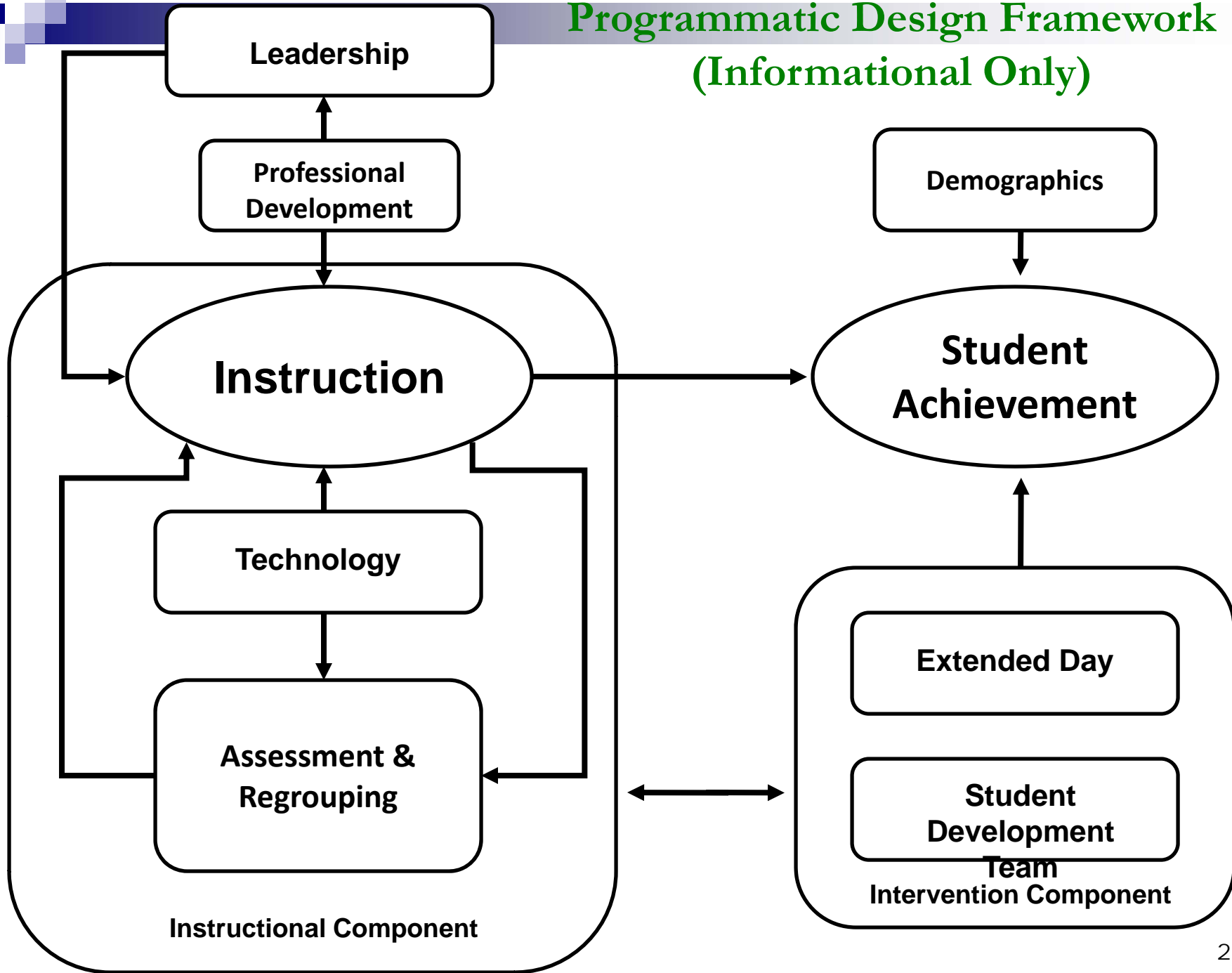
The Problem: The effects of innovations are obscured when programs designed to produce specific objectives are combined with innovations carried over from previous programs or added later, or the innovations' strategies are used by comparison groups.

Purpose: To develop and demonstrate an alternative means of assessing educational programs under conditions of multiple treatment interference and innovation diffusion and apply it to predict student achievement adjusted for the effect of fixed contextual factors.

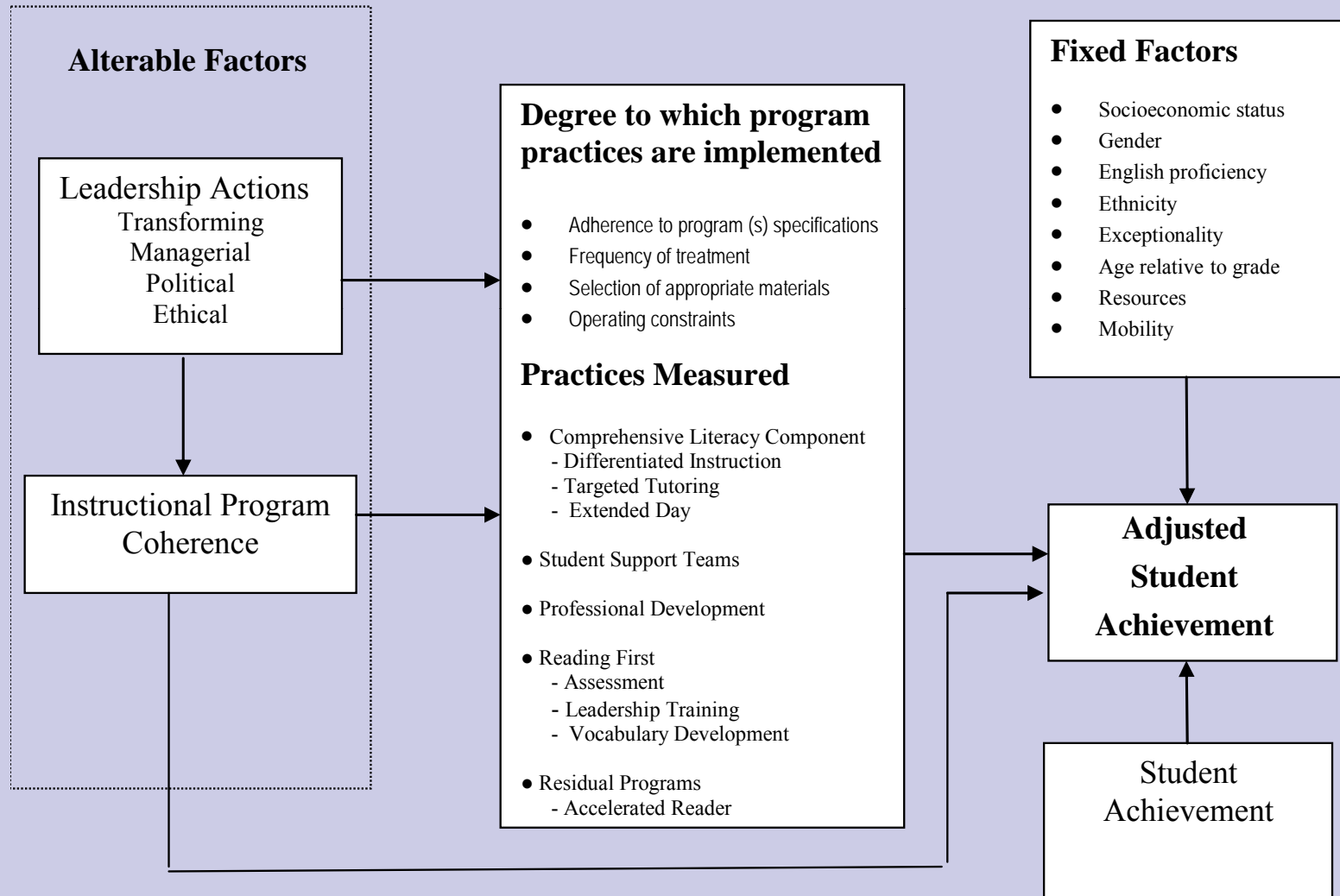
Questions:

- Do educational practices exhibit patterns of influence across the schools in the study sample?
- Do alterable variables (i.e., leadership actions and instructional program coherence) influence the use of educational practices and student achievement?
- What is the relationship between school, classroom, and student factors and the achievement of students attending schools in the study sample?
- How do implementation of the educational practices, leadership actions, and instructional program coherence interrelate to predict students' adjusted learning gains in the study sample?

Programmatic Design Framework (Informational Only)



Conceptual Framework



Review of Literature

Practices	Bond, Dykstra, Clymer, & Summers (1997); Borman & Hewes(2002); Goodman (1989); Lehman(1998); Lesnick (2006); Matthews (1965); McDaniel, Sims, & Miskel(2001); McGuinness(1997); Miskel & Song (2004), National Reading Panel (n.d.); Phenix, Siegel, Saltzman & Fruchter (2004), School Improvement Zone (2007), Urdegar (1998,1999, 2000, 2007); Venetzky (1994)
Implementation	Berman & McLaughlin (1975); Blakely, et al. (1987); Dane & Schneider (1998); Datnow (2002); Desimone (2003); Domitrovitch & Greenberg(2001); Ensminger, McLaughlin (1990); Porter, Surry, & Wright (2004); Fullan & Pomfret (1977), Parker (1980), Porter (1989); Rogers (1995);
Diffusion and Change	Aarons (2004); Ely (1990); Frambach & Schillewaert (2002); Hall & Loucks (1977); Kiraz & Odemir (2006); Kotter (1996); Moore & Benbasat (1991); Rogers (2004); Surry & Ely (2001); Surry, Jackson, Porter & Ensminger (2005)
Contextual Factors	Archibald (2006); Casanova, Garcia-Linares, de la Torre, & de la Villa Carpio (2005); Eamon (2005); Jimerson (2005); Hanushek, Kain, & Rivkin (2004); Levitt, Shay, Shpurik, & Sorhaindo (2005); McLoyd (1990); Nye, Konstantopolouss & Hedges (2004); Sammons, West, & Hind (1997); Zigarelli (1996)
Leadership	Barnett (n.d.); Bowers cited in Owens (2004); Avolio & Bass (1997); Bass (1990, 1998); Bass, Avolio, Jung, & Benson (2003);Burns (1978); Cardona (2000); Elmore (2000); Feenan (2004); Fiedler (1972); House (1971); Kroger-Hill (2004); Liden & Graen (1980); Northouse (2004); Parry (2002); Pisapia (2006, 2007); Schein (1990); Yasin (2006); Yukl (1989)
Instructional Program Coherence	Elmore (2000); Purkey & Smith (1983); Schein (1990); Newmann, King, & Youngs (2005); Newmann, Rutter & Smith (1989); Newmann, Smith, Allensworth, & Bryk (2001)

Methodology
**Perceptions of 1,565 Reading Teachers regarding
leaders and instructional program. A three step
analysis was employed:**

**Principal-axis-
factor analyses**

used to identify the patterns within educational practice, leadership action, and Instructional Program Coherence items of the survey.

**Hierarchical linear
growth modeling**

used to adjust sample teachers' students (12,875) scores for the effect of school, classroom, and student demographic factors at the classroom level.

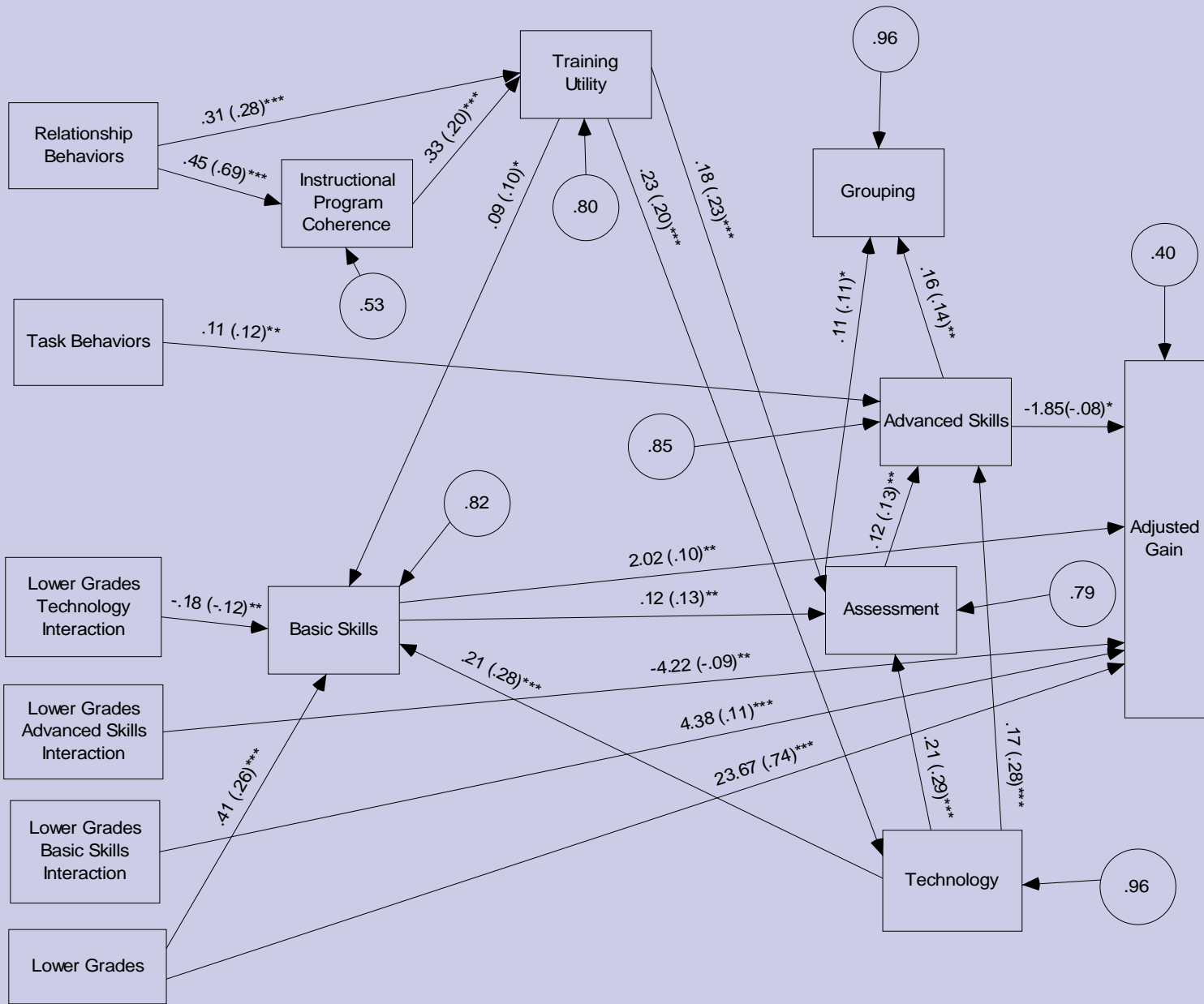
Path analysis

used to examine the interrelationship of educational practices, leader, and Instructional Program Coherence factors, and the classroom-level adjusted student achievement gains.

Results

A predictive path model was used to examine the interrelationship between the six educational practice (**Technology, Training Utility, Advanced Skills, Basic Skills, Grouping, and Assessment**), the two leadership actions (**Relationship and Task**), and the one of the two instructional program coherence factors (**Alignment and Density**) and student achievement (**classroom-level adjusted learning gains**) which were revealed through hierarchical linear modeling analysis. The Path analysis revealed that educational practices, perceived leadership actions, and instructional program coherence interrelate to predict student achievement in the following ways:

1. Educational practices exhibited patterns of influence (revealed through an earlier factor analysis) on students' adjusted learning gains.
 - ✓ **Basic Skills** instruction was found to have a significant positive effect on students' adjusted learning gains at the lower grades.
 - ✓ **Advanced Skills** instruction was found to have a non-significant positive effect on students' adjusted learning gains at the upper grades.
 - ✓ Frequency of **Technology** use was found to have a significant positive effect on frequency of **Basic Skills** instruction overall, with more positive effects seen at the upper grades.
2. Alterable variables (**Task, Relationship, and Alignment**) influenced the use of educational practices directly and student achievement indirectly.
 - ✓ **Relationship** exerts a strong effect on **Alignment** and mediates its influence on the educational practices. The more often respondents perceived their leaders as exhibiting relationship behaviors, the more likely they were to perceive training requirements as being appropriate and the more strongly they agreed that their schools exhibited instructional program coherence. 6



Conclusions

The Beyond Fidelity Method (BFM) assumes that (a) student achievement is dependent upon both the observed educational practice components and fixed unalterable factors, (b) the observed educational practice components are influenced by alterable factors that are under the control of policymakers. The BFM utilized three sequential quantitative methods to separately identify factors within educational practices, leadership action, and instructional coherence items of a survey and explored how those factors interrelated to influence student achievement.

1. Most process evaluations are approached from either fidelity or adaptation perspectives. The validity of evaluations using these approaches may be compromised when school districts, under continuous pressure to demonstrate effective performance, assemble programs from available curricular materials to demonstrate that a strategy has been put in place. This method provides insights into the inner workings of the black box that remained obscured in a fidelity or adaptive approach. The findings demonstrated that:

✓ There were significant gaps in achievement growth between students who were male and female, black and Hispanic/white, disabled and non-disabled, and retained and promoted. The patterns within the educational practices (i.e., **Technology, Training Utility, Advanced Skills, Basic Skills, Grouping, and Assessment**) were different from those specified by the program (i.e., core literacy component, tutoring for students at risk, student support teams, and professional development). Through the BFM method, one was able to identify connections among educational practices and the alterable variables and to improve on the amount of outcome variance explained by the effect of the dichotomy of treatment and control.

✓ Factor analysis of the survey items that measured the educational practices revealed the presence of six factors (i.e., **Technology, Training Utility, Advanced Skills, Basic Skills, Grouping, and Assessment**) and found that the rate of implementation of the predictors of achievement (i.e., **Advanced Skills** and **Basic Skills**) did not vary widely among respondents, which indicates that there was poor differentiation, that may have resulted from the use of similar curricular strategies and/or innovation diffusion among the programs that operated in the sample schools.

Conclusions, cont'd.

2. Classroom-level achievement growth was revealed through an unconditional Hierarchical Linear Growth Model to vary more widely than school-level growth and nearly as much proportionally as initial student differences. This finding indicates that **uncorrected teacher differences in realizing student achievement gains vary more widely than school level differences and almost as much as relatively as the ability levels of their students.** Thus, policies designed to improve student achievement through strategies directed toward teachers (e.g., professional development, teacher choice, and buy-in) may have greater impact than those that focus on improving schools (e.g., school choice and whole-school reform). Evaluations designed to gauge teachers' skills and levels of use may explain far more of the variance in student outcomes than studies that seek to measure school-level outcomes.

- ✓ Leader behaviors directed toward teachers are primarily concerned with interpersonal and work roles. Relationship behaviors were by far found to be the most important as they affected teachers' perceptions of coherence and the appropriateness of professional development and had positive indirect influence on multiple educational practices.
- ✓ Matching instruction to students' instructional level may optimize students' scores on the FCAT-NRT. Reducing the level of mismatch may not be feasible because FCAT-NRT is a nationally normed test that is not aligned to the Sunshine State Standards which drive Florida curriculum through accountability requirements measured by the FCAT-SSS.
- ✓ Teachers' capacity to provide an increased level of **Basic Skills** instruction to the upper grades is facilitated by technology use.