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## **A Summary of Conclusions Drawn from Longitudinal Analyses of Student Achievement Data over the Past 22 Years**

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## Introduction

Standardized testing of students in public schools within the United States is not new. States and districts within states have been giving standardized tests for decades and decades. However historically, the data resulting from these tests have been used for very narrow purposes. If normed-reference tests have been administered, the primary focus has been to compare the achievement level of a group of students (a state, district, school, or classroom) relative to some normative sample of students attending the same grade, or to identify the position of an individual student relative to this reference population.

Likewise, the historical use of data from criterion-referenced tests has been restricted primarily to ascertain the percentage of students who exceed some predetermined level (i.e. proficiency cut-score). However, there is a wealth of positive information that can be extracted from the test data beyond its initial intended use, which can be invaluable to education decision makers ranging from the classroom teacher to the Governor.

The results from a different approach to analyzing student achievement data will form the basis for my remarks. This approach, which I call value-added assessment, is based on the simple notion of following each student's academic progress over time. By linking each student's test records from grade to grade over subjects, then the base has been laid for a multivariate, longitudinal analysis in which each student serves as his/her own control. By so doing, educational influences on the rate of student progress can be partitioned from exogenous factors (if not completely, then nearly so) allowing an objective measure of the influence of the district, school and teacher on the rate of academic progress.

If appropriate growth rates are sustained, then many of the important equity issues in public education can be viewed from a much different perspective leading to the possibility of creative solutions. After numerating some of the findings, I would like to suggest some major policy questions that need your most creative attention.

## What Has Been Learned?

- If the variability in student academic progress is partitioned into three “buckets” – among Districts, among Schools within Districts, and among Teachers within Schools within Districts--, what is the relative amount of the variability that will go into each bucket?
  - a. Among Districts about 5%,
  - b. Among Schools within Districts about 30%,
  - c. Among Teachers within Schools within Districts about 65%.
- Differences in teacher effectiveness is the dominant factor affecting student academic progress. This is true in all subjects but is pronounced in Math.
- Teacher effects are cumulative and additive. The sequence of Math teachers that students have can have a profound effect on their ultimate achievement in Math.
- The average beginning teacher is much less effective than the average 10 -15 year experienced teacher. Beginning teachers profile at about the 35 %tile relative to the distribution of all teachers. Ten to 15 year veterans profile at about the 55 percentile.
- Teachers who leave after one year of experience on average are less effective than those who stay. The teachers who leave after one year of experience and who began teaching in schools with more than 75% minority students profile at about the 22<sup>nd</sup> percentile relative to all teachers.
- Inner city schools have a disproportionate number of beginning teachers.
- Inner city schools have much higher turnover rate of teachers than suburban schools.
- A smaller percentage of middle school math teachers within inner city schools have a high school math endorsement.
- A higher percentage of middle school math teachers are teaching with emergency certification without high school math endorsement.
- Retardation of math gain rates for high achieving inner city middle school students is more pronounced than for lower achieving students.
- Some rural districts, which have very effective elementary schools, have high schools that are not extending academic growth opportunities for average and above average achieving students. In some cases this is so severe that even the most advanced students, even if admitted to a four year university, would be nearly certain to have to take remedial courses.

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## Policy Questions

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- How can the teacher pre-service programs be changed so that the gap between beginning teachers and veterans is narrowed?
- What policies need to be in place to insure a more equitable distribution of teacher effectiveness among all schools given the current roster of teachers?
- What policies need to be in place to attract more highly effective teachers to inner city schools and more remote rural areas?

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## The Achievement Gap

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- The achievement gap as usually defined compares either the percentage of students at a proficiency level among SES groups, or compares a mean attainment score among these groups. In my view, this is not the way to look at an achievement gap in that this tends to send the wrong message.
- If gain rates within the same prior level of achievement are examined within a school or district, it will be observed that usually these rates are essentially the same across various SES groups.
- The problem is that the realized gain rates are not high enough to meet expected attainment levels in the future.
- It is the failure to have appropriate gains for the early high achieving minority students that causes the achievement gap to widen and accounts for the failure to close the gap in most instances.

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## Education Research

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- Must be more quantitative and returned to a scientific base. More involvement across the entire academic community.

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## Recommendations

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- Each state's accountability system should go beyond NCLB and include a value-added (growth) component such that the progress of all students count to minimize the "teaching to the bubble kids" and to insure that the opportunity for all students is being met. A word of caution: All value-added assessment systems that are being proposed are not the same. State leaders must invest sufficient time to learn the differences before implementation.
- Each state should seriously consider implementing a full complement of high school end-of-course tests.



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