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Kentucky's Teacher Quality Measures and Fourth-Grade Reading Achievement:

A Secondary Analysis of the 2002-2007 NAEP Data

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Abstract

This study of Kentucky's 4th-grade NAEP reading scores was designed to: (1) describe progress from 2002-2007; (2) examine score gaps by gender, race, eligibility for free/reduced lunch, and 75th/25th percentile 2002-2007, (3) explore relationships between teacher-quality and 2005/ 2007 scores. The study, begun at 2007 NAEP data training, was completed using the NAEP DataTool. Results: (1) there were no statistically significant changes in the average scale score on the NAEP Kentucky fourth-grade reading test from 2002 through 2007, (2) gaps in performance by sub-groups on Kentucky's fourth-grade reading NAEP assessments were statistically significant and unchanged across the five-year period, and (3) there were no [*alpha* .01] statistically significant differences in reading scores by teacher quality measures in either 2005 or 2007. Since reading is a skill basic to both cognitive development and overall academic achievement, Kentucky appears to be at the point of crisis as the fourth-grade reading scores across years indicate no progress between the years 2002-2007.

Kentucky's Teacher Quality Measures and Fourth-Grade Reading Achievement: A Secondary Analysis of the 2002-2007 NAEP Data

The purpose of this paper is threefold: (1) to describe the fourth-grade reading scores on the National Assessment of Educational Progress (NAEP) for Kentucky students in 2000-2007; (2) to examine the gaps and changes in gaps for selected subgroups of student scores in the datasets from 2002-2007, and (3) to explore the relationships between teacher quality measures and Kentucky students' fourth-grade reading achievement using the 2005 and 2007 NAEP data.

Since the 1999 change from the Kentucky Instructional Results Information System (KIRIS) to the Commonwealth Accountability Testing System (CATS), the National Assessment of Educational Progress (NAEP) reading scores have been used as a validation measure of the statewide system. Thus, the NAEP Kentucky fourth-grade reading data for the years 2000-2007 are being examined for indicators of improvement in learning (Koger, Thacker, Koger, & Deatz, 2003).

The No Child Left Behind Act (2001) included teacher quality as a major factor that is likely to affect student learning. Teacher quality was defined by NCLB basically as teacher credentials. These were (1) major/minor in elementary education, (2) highest academic degree, (3) type of teaching certificate, (4) years taught elementary school (NCLB, 2001).

Researchers have recently reported that the quality of the teacher in the classroom was the most important schooling factor predicting student achievement (e.g., Darling-Hammond, 2000; Darling-Hammond & Youngs, 2002; Hanhushek, Kain, & Rivkin, 1998).Wayne and Youngs (2003) found strong links between the NCLB-defined teacher quality variables and student achievement. Klecker (2007) found statistically significant relationships between teacher quality measures and eighth-grade mathematics achievement.

The National Assessment of Educational Progress (NAEP) has since 1969, been the only nationally representative and continuing assessment of what America's students know in various subject areas. The No Child Left Behind Act (2002) required participation of all school receiving Title I money from federal funds. This requirement has enlarged the data base. In 2005, teacher questionnaire data were added to include the NCLB-defined teacher quality variables (NCES, 2008).

Method

Data Analysis

The author of this study attended training to analyze the unique NAEP data in June 2007 summer of 2007. During this visit, the data analyses of NAEP of 2005 data were performed. For the follow-up of the 2002-2007 and analysis of the teacher quality variables by 2007 NAEP scores, the researcher used --as advised by NAEP training staff-- the NAEP Data Tool available on the NAEP website. [Note: IRB approval was obtained for this study.]

Results

History of Kentucky's NAEP Performance

Education Trust (2002) reported:

> Between 1992 and 1998, Kentucky 4th graders gained 5 points on the NAEP 4th grade Reading assessment. The biggest state gain over that period was 10 points. From 1992-1998, the gap between White and African American students on the NAEP 4th grade Reading increased by 7 points (p. 2).

Table 1

Kentucky's Fourth-Grade Reading Scores on NAEP 1998, 2002, 2003, 2005, 2007

Year	Average Scale Score	SD
1998	218	34
2002	219	33
2003	219	34
2005	220	34
2007	222	34

The data in Table 1 indicate that there were no statistically significant (*alpha* =.01) changes in the average scale score on the NAEP Kentucky fourth-grade reading test from 1992 through 2007. Tables 2 through 5 present gaps and changes in gaps for selected subgroups (NCES, 2008).

Tables 2 through 5 below present the data for the No Child Left Behind (NCLB) (2001) demographic categories. Table 2 presents the data for differences by gender. Table 3 presents the data for differences by race. Table 4 presents the data for differences by student free/reduced lunch, a measure of socioeconomic status and Table 5 presents the differences in scores between the 75th percentile and the 25th percentile.

Table 2.

Kentucky NAEP Reading Grade Four Score Gaps by Gender 2002-2007

	Male		Female		
Year	Average Scale Score	SE	Average Scale Score	SE	Difference (SE)
2002	214.5	(1.3)	223.9	(1.4)	-2.9 (2.3)
2003	215.2	(1.5)	222.8	(1.5)	-7.6 (2.2)
2005	217.5	(1.4)	222.5	(1.3)	-4.9 (1.9)
2007	218.8	(1.3)	226.0	(1.4)	-7.2 (1.9)

The changes in the gap year-by-year were not statistically significant, nor was the total change from 2002-2007. (The gap remained the same.) (NCES, 2008).

Table 3.

Kentucky NAEP Reading Grade Four Score Gaps by Race Across Years

	White		Black		
Year	Average Scale Score (SE)		Average Scale Score (SE)		Difference (SE)
2002	221.7	(1.0)	198.8	(2.4)	22.9 (2.6)
2003	221.4	(1.2)	201.6	(3.3)	19.8 (3.5)
2005	221.9	(1.1)	203.3	(2.3)	18.6 (2.6)
2007	224.8	(1.1)	203.3	(2.2)	21.5 (2.5)

There were no statistically significant differences in the changes in gaps between years or across years. (The gap remained the same.) (NCES, 2008).

Table 4.

Kentucky NAEP Reading Grade Four Changes in Gaps by Free/Reduced Lunch Status

	Not Eligible	Eligible	
Year	Average Scale Score (SE)	Average Scale Score (SE)	Difference (SE)
2002	229.0 (1.1)	209.3 (1.5)	19.7 (1.8)
2003	215.2 (1.5)	209.3 (1.4)	19.9 (2.2)
2005	228.0 (1.3)	211.9 (1.2)	16.1 (1.8)
2007	233.8 (1.3)	211.7 (1.2)	22.0 (1.8)

From 2002-2007 there was no statistically significant difference between or across the years. (The gap remained the same). (NCES, 2008).

Table 5.

Kentucky NAEP Reading Grade Four Gaps Between 75th and 25th Percentiles

	75th Percentile	25th Percentile	
Year	Average Scale Score (SE)	Average Scale Score (SE)	Difference (SE)
2002	242.3 (1.2)	196.8 (1.8)	45.5 (2.2)
2003	243.0 (1.4)	196.7 (1.4)	46.3 (1.9)
2005	243.6 (1.3)	197.1 (1.3)	46.5 (1.7)
2007	245.9 (1.2)	208.9 (1.3)	45.0 (1.7)

From 2002-2007 the changes in the gap were not statistically significant difference between or across the years. (The gap remained the same.) (NCES, 2008).

From the data from years 2002 through 2007 presented in Tables 2 through 5, it is apparent that the changes in the gaps were not statistically significantly (*alpha* =.01) different between or across the years. The gaps in performance by sub-groups on Kentucky's fourth-grade reading NAPE assessments were statistically significant (*p*. <.01) and remained unchanged across this five-year period.

Tables 6 though 9 present the 2005 NAEP Kentucky fourth-grade reading scores by NCLB-defined teacher quality variables (1) major/minor elementary education, (2) highest academic degree, (3) type or teaching certificate, and (4) years taught elementary or secondary.

Table 6.

Major or Minor in Elementary Education by Fourth-Grade Reading Scores 2005

Variable	Average Scale Score	SD
Major in El. Ed.	221	35
Minor/special emphasis	218	34
No	220	33

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Table 7.

Highest Academic Degree by Fourth-Grade Reading Scores 2005

Variable	Average Scale Score	SD
Bachelor's Degree	217	34
Master's Degree	222	35
Education Specialist	221	32

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Table 8.

Type of Teaching Certificate by Fourth-Grade Reading Scores 2005

Variable	Average Scale Score	SD
Regular/standard	220	34
Probationary	224	33
Provisional	213	31

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Table 9.

Years Taught Elementary or Secondary by Fourth-Grade Reading Scores 2005

Variable	Average Scale Score	SD
0-4 years	216	34
5-9 years	221	33
10-19 years	222	34
20+ years	222	35

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Tables 10 through 13 below present the same comparisons using the 2007 NAEP scores. Tested with alpha at .01, there were no statistically significant differences in mean reading scores by teacher quality measures in either 2005 or 2007.

Table 10.

Major or Minor in Elementary Education by Fourth-Grade Reading Scores 2007

Variable	Average Scale Score	SD
Major in El. Ed.	233	34
Minor/special emphasis	217	40
No	224	33

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Table 11.

Highest Academic Degree by Fourth-Grade Reading Scores 2007

Variable	Average Scale Score	SD
Bachelor's Degree	219	35
Master's Degree	225	34
Education Specialist	222	33

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Table 12.

Type of Teaching Certificate by Fourth-Grade Reading Scores 2007

Variable	Average Scale Score	SD
Regular/standard	223	35
Probationary	220	31
Provisional	227	33

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Table 13.

Years Taught Elementary or Secondary by Fourth-Grade Reading Scores 2007

Variable	Average Scale Score	SD
0-4 years	223	33
5-9 years	222	26
10-19 years	223	33
20+ years	222	36

Tested with an alpha level of .01, there were no statistically significant differences between the levels of the variable.

Conclusions

The presentation of the Kentucky fourth-grade reading scores from the National Assessment of Educational Progress (NAEP) provided evidence that:

- There was only a five point increase in the average scale score from 1992-1998
- There was only a one point increase in the average scale score from 1998-2005
- There were statistically significant gaps between scores by gender, race, SES, and percentile in 2002.
- The 2003 and 2007 NAEP data show no changes in these gaps.
- The teacher quality variables identified by NCLB were not related to any statistically significant differences in the average scale score.

The scores on the National Assessment of Educational Progress (NAEP) have been used by Kentucky to validate the scores on the Commonwealth Accountability Testing System (CATS) since 1999. Based on the findings of this study, it is recommended that the reading teaching practices in Kentucky's primary programs be re-examined. Further, the teaching of reading in Kentucky's teacher education programs should be questioned. Since reading is a skill so basic to both cognitive development and overall academic achievement, Kentucky appears to be at the point of crisis as the fourth-grade reading scores across years indicate no progress in either teaching or learning between the years 2002-2007. Further, gaps in fourth-grade reading scores by gender, race, eligibility for free/reduced lunch, and $75^{th}/25^{th}$ percentile have not changed from 2002 through 2007. These gaps are all statistically significant differences in scores and serve to further illuminate the stagnation of progress in 4^{th} grade reading in the state of Kentucky.

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