The Status and Nature of Full-Day Kindergarten in Delaware

Phase II:
The Impact of Full-Day Kindergarten on Kindergarten Work Sampling and Grades 2 & 3 DSTP Scores

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EXECUTIVE SUMMARY

This is a report of phase II of a study of the status, nature, and impact of full-day kindergarten (FDK) in Delaware public school districts. Phase I of this study examined the status and nature of FDK in Delaware (Fifield and Shepperson, 2004). This study examines the impact of FDK versus half-day kindergarten (HDK) on students' performance on Delaware Student Testing Program (DSTP) assessments.

Do students who attend FDK perform better on DSTP assessments of reading, math, and writing compared to similar students who attend HDK? To address this question we examine the performance of two cohorts of FDK students. One cohort consists of students who attended FDK in 1999-2000 (99-00) in the six public school districts that offered FDK at that time. We use a retrospective longitudinal design to examine the grades 2 and 3 DSTP scores of children who attended FDK in 99-00, compared to a demographically matched group of children who attended HDK in 99-00. The data are analyzed at the aggregate and district levels. The second FDK cohort attended kindergarten in four Delaware school districts in 2002-2003 (02-03). We compare the kindergarten work sampling scores of the 02-03 FDK cohort to a demographically matched group of HDK students in those districts during that year. The data are analyzed at the aggregate and district levels.

This study identified a small number of statistically significant differences in the performance of HDK and FDK students on DSTP assessments.

In the 99-00 FDK longitudinal study:

- The mean aggregated grade 2 DSTP2 reading scaled score for the HDK group is significantly higher than for the FDK group ($t\{354\}=1.9$, $p=.05$) [Table 2]. There is *not* a statistically significant difference in the reading progress indicators for the HDK and FDK groups (Table 3).
- There are no statistically significant differences between the HDK and FDK groups in the mean aggregated grade 3 DSTP reading and math scaled scores (Table 4), or in the aggregated reading, math, and writing performance levels (Table 5). The higher mean aggregated grade 3 DSTP math scaled score for the HDK group approaches statistical significance ($t\{356\}=1.9$, $.05< p<.06$) [Table 4].
- At the district level, the mean DSTP2 math scaled score for the HDK group in District C is significantly greater than the mean FDK score ($t\{34\}=2.9$, $p=.007$) [Table 7]. A higher percentage of HDK than FDK students in District C received a math progress indicator of 3 ("satisfactory"), but this difference is not statistically significant ($\chi^2\{1, 36\}=2.88$, $p=0.09$) [Table 9].

- There are not statistically significant differences at the district level between the HDK and FDK groups in the grade 3 DSTP1 reading and math scaled scores, or in the reading, math, and writing performance levels (Tables 10-13).

In the 02-03 kindergarten work sampling study:

- There is not a statistically significant difference in the aggregated reading work sampling scores for the HDK and FDK groups (χ^2 {2, 578}=2.64, p=0.27) [Table 17].
- There is a statistically significant difference in the aggregated FDK and HDK math work sampling scores (χ^2 {2, 567}=6.07, .04<p<.05) [Table 17]. This difference is primarily due to the higher frequency of scores of 1 ("not yet") in the FDK compared to the HDK group.
- At the district level, FDK students in District E were more likely than HDK students to receive a reading work sampling score of 3 ("proficient") rather than 2 ("in process") [Table 18 & Figure 1].
- Also in District E, FDK students were more likely than HDK to receive a math work sampling score of 3 ("proficient") rather than 2 ("in process") [Table 19 & Figure 3].
- In District C, FDK students were more likely than HDK students to receive math scores of 1 ("not yet") and 2 ("in process") rather than 3 ("proficient") [Table 19 & Figure 2].

These results can inform current policy discussions of FDK in Delaware, but they need to be interpreted in the context of other research on FDK, and with the limitations of this study clearly in mind.

The research literature FDK indicates that programs with the most impact are purposeful, focused, and coherent full-day instructional programs, not merely extensions of existing HDK programs. Phase I of this study suggested that some FDK programs in Delaware are extensions of existing HDK practices, rather than new approaches in response to new expectations (Fifield and Shepperson, 2004). Perhaps FDK programs in Delaware can achieve ambitious results, such as eliminating achievement gaps in the early grades and beyond, only through an equally ambitious and carefully considered reform of kindergarten education. Even if well-articulated FDK programs are in place, it is reasonable to expect that complementary educational programs will also be needed in later grades to sustain and extend the progress children achieve in kindergarten.

The results of this study must also be interpreted in light of its design limitations. One explanation for the apparent absence of a positive impact by FDK on DSTP scores is that the demographic variables used to match the HDK and FDK groups did not yield valid comparison groups. A shortcoming of the data available to us related to students' preschool educational experiences, and their academic performance upon entry to kindergarten. Future studies of FDK programs in Delaware will benefit if these data are systematically collected and organized for evaluation purposes.

Another interpretive caveat concerns the use of DSTP scores to assess the impact of FDK. DSTP scores are one among many ways to judge the educational impact of FDK. Although the evidence in this study that FDK positively impacts DSTP scores is very limited, this does *not* suggest that the FDK programs studied have no beneficial educational effects. On the contrary, phase I of this study describes the views of teachers and administrators who, based on firsthand experience, believe that their FDK programs have academic, developmental, and social benefits for children (Fifield and Shepperson, 2004). Teachers and others who are close to the richness and complexity of children's classroom experiences are well positioned to evaluate the multiple ways that FDK programs can impact student learning. In this context of many 'ways of knowing' about the effects of educational programs, the results of this study can complement and inform other perspectives on the nature and quality of FDK in Delaware.

Policy Considerations

- What are the characteristics of exemplary FDK programs?
- How do exemplary FDK programs integrate academic, accountability-driven perspectives with child-centered, developmentally appropriate perspectives?
- How can FDK programs be coordinated with pre-school and elementary programs to produce the greatest impact for the all children?
- What data collection systems should be in place at the school, district, and state levels to support the ongoing evaluation of FDK in Delaware?

INTRODUCTION

This is a report of phase II of a study of the status, nature, and impact of full-day kindergarten (FDK) in Delaware public school districts. Phase I of this study examined the status and nature of FDK in Delaware (Fifield and Shepperson, 2004). The phase I report suggested that while the goals of FDK in Delaware are often framed around improving literacy and math instruction in order reduce and eliminate persistent racial and economic achievement gaps, FDK programs in Delaware tend to be extensions of HDK programs, rather than purposeful, strategic redesigns of kindergarten education. Drawing on a review of research literature on FDK, the phase I report suggested that FDK approaches that merely extend HDK may not have the high impact required to close achievement gaps, while also appropriately addressing the learning needs of all students.

This study examines the impact of FDK versus half-day kindergarten (HDK) on students' performance on Delaware Student Testing Program (DSTP) assessments. Do students who attend FDK perform better on DSTP assessments of reading, math, and writing compared to similar students who attend HDK? To address this question we examine the performance of two cohorts of FDK students. One cohort consists of students who attended FDK in 1999-2000 (99-00) in the six public school districts that offered FDK at that time. We use a retrospective longitudinal design to examine the grades 2 and 3 DSTP scores of children who attended FDK in 99-00, compared to a demographically matched group of children who attended HDK in 99-00. The second FDK cohort attended kindergarten in four Delaware school districts in 2002-2003 (02-03). We compare the kindergarten work sampling scores of the 02-03 FDK cohort to a demographically matched group of HDK students in those districts during that year. This study therefore combines an examination of the 'long-term' impacts (i.e., through grades 2 and 3) of FDK, with a look at the impact of FDK on work sampling assessments completed in the spring of the kindergarten year.

METHODS

99-00 FDK Longitudinal Study

The 99-00 FDK Cohort. For this study, the six public school districts that offered FDK in 99-00 identified 295 children enrolled in FDK that year. Of those 295 students, 179 had grade 3 DSTP scores in the Delaware Department of Education (DOE) Delaware Student Information System (DELSIS) database. These 179 students comprise the 99-00 FDK cohort. The entire cohort was used in analyses of performance data that were aggregated across the six districts. District-level FDK cohorts were constructed by disaggregating the full FDK cohort into subgroups for each of the six school districts.

The 99-00 HDK Comparison Groups. A matched comparison group to the full FDK cohort was constructed by selecting a stratified random sample of students who attended HDK in a Delaware public school district in 99-00, and who had grade 3 DSTP scores from 2002-2003 in the DELSIS database. To match the HDK comparison group to the demographic characteristics of the FDK cohort, the comparison group was stratified by these demographic characteristics:

- gender
- race
- eligible for free or reduced-price lunch (a marker for low income)
- Title I status
- limited English proficiency (LEP), and
- special education

The resulting HDK comparison group of 179 students was used in the comparative analysis of data that were aggregated across the six school districts.

In addition to the comparison group used during the analysis of aggregated data, district-level comparison groups were constructed by selecting stratified random samples of students who attended the appropriate district, and who had grade 3 DSTP scores in DELSIS. These comparison groups were matched as closely as possible to the district FDK cohorts using the same demographic characteristics listed above.

Comparative Measures of Academic Performance. We compared the performance of the FDK and HDK groups on the grades 2 and 3 DSTP assessments. The DELSIS database was the source of the following data for students in the FDK and HDK groups:

- grade 2 DSTP2 reading and math scaled scores and progress indicators, and
- grade 3 DSTP reading and math scaled scores, and reading, math and writing performance levels.

Comparisons at aggregate and district levels were made of mean DSTP1 and DSTP2 reading and math scaled scores, the frequencies of DSTP1 reading, math, and writing performance levels, and DSTP2 reading and math progress indicators. Independent sample T-tests were used to test for statistically significant differences between mean reading and math scaled scores for matched HDK and FDK groups. Chi square tests were used to compare the performance levels and progress indicators of matched HDK and FDK groups. In this study, statistical significance is defined as a probability of .05 or less that a difference is due to chance variation (i.e., $p \leq .05$).

The University of Delaware Education Research and Development Center obtained authorization from the Delaware Department of Education to use anonymous student test and demographic data from the DELSIS database. The study design was approved by the Human Subjects Review Board at the University of Delaware.

02-03 Kindergarten Work Sampling Study

The 02-03 FDK Cohort. Four public school districts that offered FDK in 02-03 identified 339 children enrolled in FDK that year. Of those 339 students, 310 had kindergarten work sampling scores in the DELSIS database. These 310 students comprise the 02-03 FDK cohort. The entire cohort was used in analyses of DSTP data that were aggregated across the four districts. District-level FDK cohorts were constructed by disaggregating the full 02-03 FDK cohort into subgroups for each of the four school districts.

The 02-03 HDK Comparison Groups. A matched comparison group to the full 02-03 FDK cohort was constructed by selecting a stratified random sample of students who attended HDK in the four public school districts from which the FDK cohort was drawn, and who had kindergarten work sampling scores in the DELSIS database. The HDK comparison group was matched as closely as possible to the FDK cohort using stratified random sampling and the same demographic characteristics listed above for the 99-00 FDK longitudinal study.

In addition to the comparison group used to analyze aggregated data, district-level comparison groups were constructed by selecting stratified random samples of students who attended the appropriate districts, and who had kindergarten work sampling scores in DELSIS. These comparison groups were matched as closely as possible to the district FDK cohorts using the same demographic characteristics listed above.

Comparative Measures of Academic Performance. We compared the performance of the 02-03 FDK and HDK groups on the kindergarten reading and math work sampling assessments. The work sampling scores recorded in the DELSIS database were generated in the spring of the kindergarten year. Chi square tests were used to test the statistical significance of differences in the work sampling scores of the matched HDK and FDK cohorts at aggregate and district levels.

Limitations of this Research Design

The Variable Nature of FDK Programs. The 99-00 FDK longitudinal study uses data from the six school districts that offered FDK in that year. The nature of the 99-00 FDK programs are difficult to document in hindsight, but it is clear that the programs varied among the districts (Fifield and Shepperson, 2004). The 02-03 kindergarten work sampling portion of this study is based on data from four districts. These districts are a non-random sample of the 12 Delaware school districts that offered FDK in 02-03. While the nature of FDK programs in Delaware deserves closer study, phase I of this study suggested that there are important differences among FDK programs in the state. Because "FDK"

means different things in different districts and classrooms in Delaware, claims about the nature and impact of FDK programs in the state should be carefully qualified.

Comparison Groups. This study consists of retrospective analyses of DSTP performance data drawn from existing, non-randomly assigned populations of HDK and FDK students. This design constrains our ability to construct comparable groups of HDK and FDK students, since the HDK and FDK student populations in 99-00 and 02-03 were not randomly assigned. Moreover, in all the districts included in this study, some or all FDK students were selected based on formal and/or informal screening procedures to identify students with heightened educational needs or deemed to be "at-risk" of making inadequate progress in typical kindergarten instruction. The nature and extent of FDK eligibility screening varied among districts, and within districts over time. This decidedly non-random selection process was likely to have skewed the characteristics of the resulting FDK and HDK populations. To counter this effect, we matched the HDK and FDK students drawn from these populations as closely as possible across six significant demographic variables. Nevertheless, the characteristics of the HDK and FDK cohorts that we selected were likely influenced by the non-random characteristics of the source populations.

Construction of comparable HDK and FDK groups is also complicated by the lack of consistent and accessible information concerning students' educational experiences prior to kindergarten and their academic performance at the time of entry to kindergarten. For example, due to the lack of data at the district and state levels, we were unable to account for students' pre-school educational experiences when constructing the HDK comparison groups.

DSTP Assessments as Measures of Educational Impact. This study compares HDK and FDK students' performances on kindergarten work sampling, DSTP1, and DSTP2 reading, math, and writing assessments. DSTP assessments are only one kind of comparative measure of educational impact among a great variety of data sources and interpretive perspectives that can and should be considered when evaluating the effects and value of FDK.

RESULTS

99-00 FDK Longitudinal Study

This portion of the report compares the performance of 99-00 FDK and HDK students on grades 2 and 3 DSTP assessments.

99-00 FDK Cohort & HDK Comparison Group

The six participating districts identified 295 students who were enrolled in FDK in 99-00. The DOE DELSIS database contains grade 3 (2002-2003) DSTP scores for 179 of these students, who comprise the FDK cohort for this portion of the study. The demographic profiles of the 99-00 FDK cohort and the HDK comparison group are exactly matched on all characteristics that were used in the selection process (Table 1).

Table 1. 99-00 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=179)	HDK (N=179)
Gender	Male	64%	64%
	Female	36%	36%
Special Education		17%	17%
Title 1		64%	64%
Low Income		47%	47%
Limited-English Proficient		3%	3%
Race			
Black		40%	40%
Asian/Pacific Islander		2%	2%
Hispanic		15%	15%
White		44%	44%

Aggregated Data – DSTP2 (grade 2) Reading and Math Performance

This section reports the performance of the FDK and HDK groups on DSTP2 reading and math assessments. The data are aggregated across the six participating districts.

Table 2 contains the mean aggregated grade 2 DSTP2 scaled scores for reading and math. The mean reading scaled score for the HDK group is significantly higher than the score for the FDK group ($t(354)=1.9$, $p=.05$). There is no significant difference in the DSTP2 math scaled scores of the FDK and HDK groups ($t(354)=.13$, $p=.89$).

Table 2. Mean DSTP2 (grade 2) reading and math scaled scores for 99-00 HDK and FDK groups aggregated across six districts. (*statistically significant at p≤.05)

	Mean (S.E.)	T-test
DSTP2 Reading Scaled Score		
HDK (N=179)	397.7 (3.0)	*t*(354)=1.9
FDK (N=177)	389.3 (3.0)	*p*=.05*
DSTP2 Math Scaled Score		
HDK (N=179)	375.7 (4.3)	*t*(354)=.13
FDK (N=177)	375.1 (3.0)	*p*=.89

Table 3 shows the aggregated DSTP2 reading and math progress indicators for the FDK and HDK groups. There is no significant difference between the FDK and HDK groups in the reading (χ^2 {2, 356}=1.07, p=0.58) or math (χ^2 {2, 354}=1.24, p=0.54) progress indicators.

Table 3. DSTP2 (grade 2) reading and math progress indicators for 99-00 HDK and FDK groups, aggregated across six districts. Percent and (number) of students at each performance level (percentages may not total 100 due to rounding).

	1 Unsatisfactory	2 Warning	3 Satisfactory	c^2 (df, N) *p*
HDK (N= 179)	26% (47)	3% (6)	70% (126)	χ^2 (2, 356)=1.07
DSTP2 Reading				*p*=0.58
FDK (N=177)	39% (70)	2% (4)	67% (119)	
HDK (N=179)	37% (66)	9% (16)	54% (95)	χ^2 (2, 354)=1.24
DSTP2 Math				*p*=0.54
FDK (N=177)	39% (70)	12% (21)	49% (86)	

Aggregated Data – DSTP1 (grade 3) Reading and Math Performance

The following data for FDK and HDK groups on grade 3 DSTP1 reading, math, and writing assessments are again aggregated across the six participating districts.

Table 4 contains the mean aggregated grade 3 DSTP1 scaled scores for reading and mathematics for the FDK and HDK groups. There is no significant difference in either the reading (*t*(356)=.95, *p*=.34) or math (*t*(356)=1.9, .05< *p*<.06) scaled scores.

Table 4. Mean DSTP1 (grade 3) reading and math scaled scores for 99-00 HDK and FDK groups, aggregated across six districts.

	Mean (S.E.)	T-test
DSTP1 Reading Scaled Score		
HDK (N=179)	433.5 (2.8)	$t(356)=.95$
FDK (N=179)	429.6 (3.0)	$p=.34$
DSTP1 Math Scaled Score		
HDK (N=179)	429.2 (3.4)	$t(356)=1.9$,
FDK (N=179)	420.1 (3.2)	$.05< p<.06$

Table 5 contains the performance levels in reading, math, and writing for the FDK cohort and the HDK comparison group on the grade 3 DSTP1 assessment. (In this and other tables of performance levels, data from comparable performance levels are sometimes combined to yield sample sizes large enough to perform a Chi square statistical analysis.) There are no statistically significant differences in the aggregated grade 3 DSTP1 reading, math, or writing performance levels of the HDK and FDK groups.

Putting the Aggregated 99-00 FDK Longitudinal Data in a Broader Context

Table 6 compares the percent of 99-00 FDK students who met or exceeded the state performance standard on the Grade 3 DSTP reading, math, and writing assessments with statewide figures disaggregated by demographic group. These data are not statistically analyzed for significant differences, but they do provide a view of the general relationship between FDK and statewide pass rates. The pass rates in reading and writing for low-income FDK students were comparable to the statewide rate for low income students. In math, the pass rate for low-income FDK students was somewhat lower than the state average for low income students. Limited-English proficient (LEP) students in FDK appear to pass all subjects at a lower rate than the LEP state average, but this is based on a sample size of just 6 FDK LEP students. With the exception of a very small sample of Asian/Pacific Islander students, FDK students in all racial groups appear to pass at comparable or lower rates compared to the statewide average for students in those groups.

Table 5. DSTP1 (grade 3) reading, math, and writing performance levels for 99-00 HDK and FDK groups, aggregated across six districts. Percent and (number) of students at each performance level (percentages may not total 100 due to rounding). Some performance levels are merged to allow statistical analysis.

		1 Well Below	2 Below	3 Meets	4 Exceeds	5 Distinguished	c^2 (df, N) *p*
Reading	HDK (N= 179)	11% (20)	20% (35)	47% (85)	12% (21)	10% (18)	χ^2 (4, 358)=2.55 *p*=0.64
	FDK (N=179)	14% (26)	16% (29)	51% (91)	8% (15)	10% (18)	
Math	HDK (N=179)	16% (28)	18% (32)	43% (77)	17% (31)	6% (11)	χ^2 (4, 358)=5.14 *p*=0.27
	FDK (N=179)	18% (33)	19% (34)	48% (86)	12% (21)	3% (5)	
Writing	HDK (N=179)	33% (60)	37% 66)	30% (53)		0	χ^2 (2, 358)=0.28 *p*=0.87
	FDK (N=179)	35% (63)	34% (61)	30% (54)			

Table 6. Percent of students whose grade 3 DSTP reading, math, and writing performance level met or exceeded (i.e., performance level of 3 or above) the state standard, spring 2003. (Disaggregated numbers of 99-00 FDK students are in the reading column; the same numbers apply to those demographic groups in the math and writing columns.)

Demographic Characteristics		99-00 FDK reading % (N)	Statewide reading % (N)	99-00 FDK math % (N)	Statewide math % (N)	99-00 FDK writing % (N)	Statewide writing % (N)
Gender	Male	66% (115)	76% (4054)	64%	75%(4449)	30%	32% (4422)
	Female	75% (64)	82% (4175)	61%	73%(4369)	28%	47% (4354)
Special Education		48% (31)	44% (471)	42%	41%(1021)	13%	10% (1007)
Low Income		69% (84)	68% (3380)	57%	62%(3780)	26%	27% (3745)
Limited English Proficient		33% (6)	67% (94)	33%	51%(129)	17%	23% (120)
Race							
Black		62% (71)	65% (2757)	46%	56% (2983)	25%	28% (2964)
Asian/Pacific Islander		100% (3)	92% (222)	100%	92% (225)	33%	65% (223)
Hispanic		65% (26)	73% (538)	62%	67% (618)	19%	30% (606)
White		76% (79)	88% (4691)	76%	81% (4969)	38%	46% (4960)
All Students		**70% (179)**	**79% (8229)**	**63%**	**74% (8818)**	**30%**	**39% (8776)**

District-Level Data – DSTP2 (grade 2) Reading and Math Performance

This section describes the district-level performance of the 99-00 FDK cohorts and HDK comparison groups on DSTP2 reading and math assessments. The demographic characteristics of the FDK cohorts and the HDK comparison groups for each of the six districts are in Appendix A. For within-district HDK comparison groups, some demographic variables are closely matched to the FDK groups, and others are not (see Appendix A). This is because the population of HDK students in a district sometimes did not contain the demographic variation needed to precisely match the FDK students from that district.

The mean reading and math scaled scores on the grade 2 DSTP2 for HDK and FDK groups in each district are in Table 7. There are no significant differences in the scores of the HDK and FDK groups, with the exception of the math scaled score in District C. In that case, the mean score for the HDK group is significantly higher than the score for the FDK group ($t(34)=2.9$, $p=.007$). In District A, the mean FDK math scaled score is slightly higher than the HDK mean score, but the sample size is too small to perform a statistical test for significance.

Table 8 shows the grade 2 DSTP2 reading progress indicators for the HDK and FDK groups in each district. The math progress indicators for the two groups in each district are in Table 9. The sample size in District A is too small to perform a statistical test for difference between the FDK and HDK groups. In the remaining districts, there is no significant difference in the reading or math progress indicators of the FDK and HDK groups.

Table 7. Mean DSTP2 (grade 2) reading and math scaled scores for 99-00 HDK and FDK groups, by district. Mean (S.E.). (*statistically significant at p≤.05)

	District A	District B	District C	District D	District E	District F
DSTP2 Reading Scaled Scores						
HDK	368.3 (16) N=3	403.5 (5.7) N=48	399.5 (4.8) N=17	390.7 (6.8) N=37	416.4 (8.5) N=14	398.3 (6.1) N=17
FDK	366.4 (14.3) N=5	400.2 (5.1) N=53	381 (8.4), N=19	384.8 (6.9) N=39	404.1 (8.6) N=17	381.9 (10.9) N=17
T-test	NA	$t(99)=.43$, $p=.67$	$t(34)=1.8$, $p=.07$	$t(74)=.61$, $p=.55$	$t(29)=1$, $p=.32$	$t(32)=1.3$, $p=.20$
DSTP2 Math Scaled Scores						
HDK	363 (26.5) N=3	394.6 (5.1) N=48	370.8 (5.2) N=17	382.3 (5.4) N=37	410.1 (8.7) N=14	381.9 (6.6) N=17
FDK	367 (9.5) N=5	384.8 (5.9) N=53	347.5 (6.0) N=19	375.9 (7.3) N=39	393.6 (10.2) N=17	369.3 (8.0) N=17
T-test	NA	$t(99)=1.2$, $p=.22$	$t(34)=2.9$, $p=.007$*	$t(74)=.70$, $p=.49$	$t(29)=1.2$, $p=.24$	$t(32)=1.2$, $p=.24$

Table 8. DSTP2 (grade 2) reading progress indicators for 99-00 HDK and FDK groups, by district. Percent and (number) of students. (Some progress indicator levels are merged to allow statistical analysis.)

		1 Unsatisfactory	2 Warning	3 Satisfactory	c^2 (df, N) *p*
District A	HDK (N=3)	67% (2)	0	33% (1)	insufficient sample size
	FDK (N=5)	40% (2)		60% (3)	
District B	HDK (N=48)	23% (11)		77% (37)	χ^2 (1, 101)=0.001 *p*=0.97
	FDK (N=53)	23% (12)		77% (41)	
District C	HDK (N=17)	12% (2)		88% (15)	χ^2 (1, 36)=3.01 *p*=0.08
	FDK (N=19)	37% (7)		63% (12)	
District D	HDK (N=37)	35% (13)		65% (24)	χ^2 (1, 76)=0.09 *p*=0.76
	FDK (N=39)	38% (15)		61% (24)	
District E	HDK (N=14)	21% (3)		79% (11)	χ^2 (1, 31)=0.07 *p*=0.79
	FDK (N=17)	18% (3)		82% (14)	
District F	HDK (N=17)	23% (4)		76% (13)	χ^2 (1, 34)=1.21 *p*=0.27
	FDK (N=17)	41% (7)		59% (10)	

Table 9. DSTP2 (grade 2) math progress indicators for 99-00 HDK and FDK groups, by district. Percent and (number) of students. (Some progress indicator levels are merged to allow statistical analysis.)

		1 Unsatisfactory	2 Warning	3 Satisfactory	c^2 (df, N) *p*
District A	HDK (N=3)	67% (2)	0	33% (1)	insufficient sample size
	FDK (N=5)	40% (2)	20% (1)	40% (2)	
District B	HDK (N=48)	19% (9)	6% (3)	75% (36)	χ^2 (2, 101)=3.78 *p*=0.152
	FDK (N=53)	32% (17)	11% (6)	57% (30)	
District C	HDK (N=17)	59% (10)		41% (7)	χ^2 (1, 36)=2.88 *p*=0.09
	FDK (N=19)	84% (16)		16% (3)	
District D	HDK (N=37)	43% (16)		57% (21)	χ^2 (1, 76)=0.001 *p*=0.98
	FDK (N=39)	44% (17)		56% (22)	
District E	HDK (N=14)	14% (2)		86% (12)	χ^2 (1, 31)=2.69 *p*=0.10
	FDK (N=17)	41% (7)		59% (10)	
District F	HDK (N=17)	35% (6)		65% (11)	χ^2 (1, 34)=1.89 *p*=0.17
	FDK (N=17)	59% (10)		41% (7)	

District-Level Data – DSTP1 (3rd Grade) Reading, Math, and Writing Performance

This section describes the district-level performance of FDK and HDK groups on grade 3 DSTP1 reading, math, and writing assessments.

Table 10 contains the mean grade 3 DSTP1 reading and math scaled scores for each district. There are no significant differences between the FDK and HDK groups at the district level on the reading and math scaled scores. The sample size in District A is too small to perform a statistical test for difference between the FDK and HDK groups.

Tables 11, 12, and 13 contain the grade 3 DSTP1 reading, math, and writing performance levels, respectively. Consistent with the scaled score results, there are no significant differences in the FDK and HDK performance level scores in any of the districts. The sample size in District A is too small to perform a statistical test for difference between the FDK and HDK groups.

Table 10. Mean DSTP1 (grade 3) reading and math scaled scores for 99-00 HDK and FDK groups, by district. Mean (S.E.).

	District A	District B	District C	District D	District E	District F
DSTP1 Reading Scaled Scores						
HDK	397.2 (24.1) N=4	437.5 (4.8) N=50	432.7 (7.4) N=18	437.1 (6.3) N=37	435.9 (7.7) N=14	435.4 (7.3) N=17
FDK	418.8 (13.8) N=5	439.0 (5.4) N=54	424.7 (10.8) N=19	429.6 (6.6) N=40	434.7 (9.1) N=17	428.5 (7.5) N=17
T-test	small sample	$t(102)=-.20$, $p=.84$	$t(35)=.60$, $p=.55$	$t(75)=.82$, $p=.41$	$t(29)=.09$, $p=.92$	$t(32)=.66$, $p=.51$
DSTP1 Math Scaled Scores						
HDK	397.7 (26.4) N=4	436.9 (5.7) N=50	416.5 (7.0) N=18	430.2 (6.0) N=37	439.5 (10.3) N=14	432.8 (6.0) N=17
FDK	410 (9.4) N=5	428.8 (6.4) N=54	395.5 (8.2) N=19	422.0 (6.7) N=40	435.1 (11.7) N=17	423.3 (8.0) N=17
T-test	small sample	$t(102)=.94$, $p=.35$	$t(35)=1.9$, $p=.06$	$t(35)=.90$, $p=.37$	$t(29)=.27$, $p=.79$	$t(32)=.94$, $p=.35$

Table 11. DSTP1 (grade 3) reading performance levels for 99-00 HDK and FDK groups, by district. Percent and (number) of students at each performance level (percentages may not total 100 due to rounding). Some performance levels are merged to allow statistical analysis.

		1 Well Below	2 Below	3 Meets	4 Exceeds	5 Distinguished	c^2 (df, N) *p*
District A	HDK (N=4)	75% (3)	0	0	25% (1)	0	insufficient sample size
	FDK (N=5)	20% (1)	0	80% (4)	0	0	
District B	HDK (N=50)	6% (3)	14% (7)	60% (30)	10% (5)	10% (5)	χ^2 (4, 104)=3.74 *p*=0.44
	FDK (N=54)	13% (7)	11% (6)	46% (25)	11% (6)	18% (10)	
District C	HDK (N=18)	17% (3)		83% (15)			χ^2 (1, 37)=1.91 *p*=0.17
	FDK (N=19)	37% (7)		63% (12)			
District D	HDK (N=37)	11% (4)	11% (4)	57% (21)	22% (8)		χ^2 (3, 77)=1.29 *p*=0.73
	FDK (N=40)	12% (5)	15% (6)	60% (24)	12% (5)		
District E	HDK (N=14)	29% (4)		71% (10)			χ^2 (1, 31)=.003 *p*=0.96
	FDK (N=17)	29% (5)		71% (12)			
District F	HDK (N=17)	18% (3)		82% (14)			χ^2 (1, 34)=.18 *p*=0.67
	FDK (N=17)	23% (4)		76% (13)			

Table 12. DSTP1 (grade 3) math performance levels for 99-00 HDK and FDK groups , by district. Percent and (number) of students at each performance level (percentages may not total 100 due to rounding). Some performance levels are merged to allow statistical analysis.

	1 Well Below	2 Below	3 Meets	4 Exceeds	5 Distinguished	c^2 (df, N) *p*
District A HDK (N= 4)	50% (2)	25% (1)	0	25% (1)	0	insufficient sample size
District A FDK (N=5)	20% (1)	20% (1)	60% (3)	0	0	
District B HDK (N=50)	10.0% (5)	10.0% (5)	54% (27)	26% (13)		χ^2 (3, 104)=3.58 *p*=0.31
District B FDK (N=54)	13% (7)	22% (12)	41% (22)	24% (13)		
District C HDK (N=18)	33 (6)		67% (12)			χ^2 (1, 37)=0.75 *p*=0.38
District C FDK (N=19)	47% (9)		53% (10)			
District D HDK (N=37)	8% (3)	16% (6)	54% (20)	22% (8)		χ^2 (3, 77)=2.46 *p*=0.48
District D FDK (N=40)	17% (7)	20% (8)	50% (20)	12% (5)		
District E HDK (N=14)	21% (3)		43% (6)	36% (5)		χ^2 (2, 31)=0.29 *p*=0.86
District E FDK (N=17)	29% (5)		41% (7)	29% (5)		
District F HDK (N=17)	12% (2)		88% (15)		0	χ^2 (1, 34)=1.62 *p*=0.20
District F FDK (N=17)	29% (5)		71% (12)		0	

Table 13. DSTP1 (grade 3) writing performance levels for 99-00 HDK and FDK groups, by district. Percent and (number) of students at each performance level (percentages may not total 100 due to rounding). Some performance levels are merged to allow statistical analysis.

		1 Well Below	2 Below	3 Meets	4 Exceeds	5 Distinguished	c^2 (df, N) *p*
District A	HDK (N=4)	25% (1)	75% (3)	0	0	0	insufficient sample size
	FDK (N=5)	40% (2)	60% (3)				
District B	HDK (N=50)	28% (14)	38% (19)	34% (17)	0	0	χ^2 (2, 104)=.63 *p*=0.73
	FDK (N=54)	35% (19)	35% (19)	30% (16)			
District C	HDK (N=18)	22% (4)	50% (9)	28% (5)	0	0	χ^2 (2, 37)=3.91 *p*=0.14
	FDK (N=19)	47% (9)	21% (4)	32% (6)			
District D	HDK (N=37)	30% (11)	49% (18)	22% (8)		0	χ^2 (2, 76)=2.43 *p*=0.30
	FDK (N=39)	31% (12)	33% (13)	36% (14)			
District E	HDK (N=14)	64% (9)		36% (5)	0	0	χ^2 (1, 31)=.097 *p*=0.76
	FDK (N=17)	59% (10)		41% (7)			
District F	HDK (N=17)	35% (6)	29% (5)	35% (6)	0	0	χ^2 (2, 34)=.182 *p*=0.91
	FDK (N=17)	35% (6)	35% (6)	29% (5)			

Mobility and Grade Retention in the 99-00 FDK Cohort

In the 99-00 FDK longitudinal study, six districts identified 295 students who were enrolled in FDK in 99-00. The DELSIS database contained grade 3 DSTP scores for 179 students of those students. What happened to the remaining 116 students? Thirteen of the 116 could not be found in DELSIS. The remaining 103 students were located in DELSIS, but they had no grade 3 DSTP scores from the spring of 2003 (Table 14). Twenty-nine percent of these 103 students moved between school districts in Delaware *at least* once during their K-2 school years. Forty-six of the 103 students apparently left the Delaware public school system before spring of 2003, either by entering private schools or moving out of the state. The remaining 57 students stayed in Delaware public schools, but were retained in a grade one or more times between kindergarten and grade 3. Most of these students were retained in grades 1 and 2, not in kindergarten (Table 15).

Table 14. 99-00 FDK students with no grade 3 DSTP score in spring 2003.

		99-00 FDK (N=103)
Gender	Male	57
	Female	46
Race		
Am. Indian/Alaska Native		1
Black		46
Asian/Pacific Islander		1
Hispanic		16
White		39

Table 15. Number of 99-00 FDK students who were retained in grades K-3.

Grade Retained	**No. of 99-00 FDK students**
K	4
1	24
2	28
3	1

02-03 Kindergarten Work Sampling Study

This portion of the report describes the performance of 02-03 FDK and HDK students on kindergarten reading and math work sampling assessments.

FDK Cohort & HDK Comparison Group

For this study, four districts identified 339 students enrolled in FDK in 2002-2003, of whom 310 had kindergarten work sampling scores in the DELSIS database. Table 16 contains the demographic profiles of the 02-03 FDK cohort and the HDK comparison group.

Table 16. 02-03 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=310)	HDK (N=271)
Gender	Male	55%	66%
	Female	45%	34%
Special Education		4%	4%
Title 1		57%	64%
Low Income		46%	40%
Limited English Proficient		13%	4%
Race			
Black		28%	32%
Asian/Pacific Islander		2%	1%
Hispanic		16%	7%
White		54%	60%

Aggregated Data – Kindergarten Reading and Math Work Sampling

This section describes aggregated performance data for the 02-03 FDK and HDK groups on kindergarten reading and math work sampling assessments.

Table 17 contains the aggregated reading and math work sampling scores for the 02-02 FDK and HDK groups. There is no statistically significant difference between the reading work sampling scores of the FDK and HDK groups (χ^2 {2, 578}=2.64, p=0.27). There is a statistically significant difference in the FDK and HDK math work sampling scores (χ^2 {2, 567}=6.07, .04<p<.05). This difference is due largely to the higher frequency of scores of 1 ("not yet") in the FDK group compared to the HDK group. Note, however, that the majority of students in both groups received scores of 2 ("in process") or 3 ("proficient").

Table 17. Kindergarten reading and math work sampling scores for 02-03 HDK and FDK groups, aggregated across four districts (B, C, E, and G). Percent and (number) of students at each level Percentages may not total 100 due to rounding. (*statistically significant at p≤.05)

		1 Not yet	2 In process	3 Proficient	c^2 (df, N) *p*
Reading	HDK (N=268)	0.7% (2)	41% (110)	58% (156)	χ^2 (2, 578)=2.64 *p*=0.27
	FDK (N=310)	1% (3)	34% (107)	64% (200)	
Math	HDK (N=266)	0.4% (1)	51% (135)	49% (130)	χ^2 (2, 567)=6.07 .04<*p*<.05*
	FDK (N=301)	3% (9)	47% (140)	50% (152)	

District-Level Data – Kindergarten Reading and Math Work Sampling

This section describes the district-level performance of the 02-03 FDK and HDK groups on kindergarten reading and math work sampling assessments. The demographic characteristics of the district FDK cohorts and HDK comparison groups are in Appendix B. For within-district HDK comparison groups, some demographic variables are closely matched to the FDK groups, and others are not (see Appendix B). This is because the population of HDK students in a district sometimes did not contain the demographic variation needed to match precisely the FDK students from that district.

The kindergarten reading work sampling results for the FDK and HDK groups in each district are in Table 18. Three of the four districts show no significant difference between the FDK and HDK groups. However, in District E, the FDK group has a significantly different distribution of work sampling scores compared to the HDK group (χ^2 {2, 138}=7.50, *p*=0.02**)**. In District E, students in the FDK group were 2.9 times more likely to receive a reading work sampling score of 3 than 2, compared to students in the HDK group (Figure 1).

Table 18. Kindergarten reading work sampling scores for 02-03 matched HDK and FDK groups, by district. Percent and (number) of students at each level. Percentages may not total 100 due to rounding. (*statistically significant at p≤.05)

	1 Not yet	2 In process	3 Proficient	c^2 (df, N) *p*
HDK (N=48)	2% (1)	29% (14)	69% (33)	χ^2 (2, 180)=5.53
District B				*p*=0.06
FDK (N=132)	0	18% (24)	82% (108)	
HDK (N=40)	2% (1)	77% (31)	20% (8)	χ^2 (2, 117)=0.36
District C				*p*=0.83
FDK (N=77)	3% (2)	82% (63)	16% (12)	
HDK (N=64)	0	39% (25)	61% (39)	χ^2 (2, 138)=7.50
District E				*p*=0.02*
FDK (N=74)	1% (1)	19% (14)	80% (59)	
HDK (N=25)	0	8% (2)	92% (23)	χ^2 (2, 52)=2.02
District G				*p*=0.16
FDK (N=27)	0	22% (6)	78% (21)	

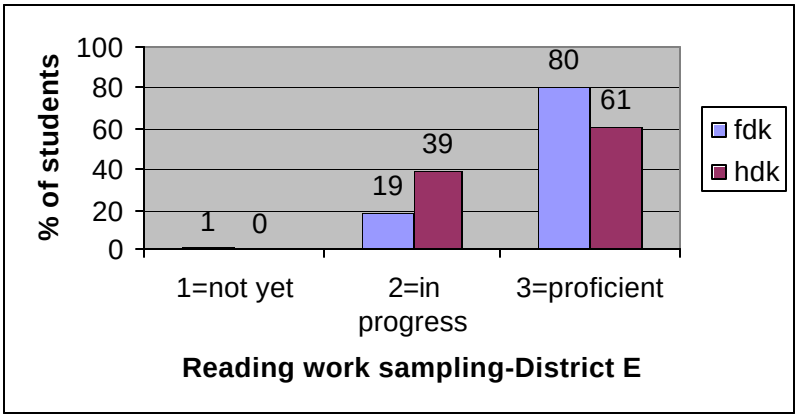

Figure 1. FDK and HDK reading work sampling in District E.

Table 19 contains the kindergarten math work sampling results for the FDK and HDK groups in each district. Two of the four districts show no significant difference between the FDK and HDK groups. In district C, no FDK students received a score of 3 ("proficient"), and they were more likely than HDK students to receive a score of 1 ("not yet") [Figure 2]. Conversely, in District E, FDK students were more likely than HDK students to receive a score of 3 ("proficient)" than 2 ("in process") [Figure 3].

Table 19. Kindergarten math work sampling scores for 02-03 HDK and FDK groups, by district. Percent and (number) of students at each level. Percentages may not total 100 due to rounding. (*statistically significant at p≤.05)

	1 Not yet	2 In process	3 Proficient	c^2 (df, N) *p*
HDK (N=47)	0	45% (21)	55% (26)	$\chi^2(1, 175)=.23$
District B				$p=0.63$
FDK (N=128)	0	41% (52)	59% (76)	
HDK (N=41)	2% (1)	78% (32)	19% (8)	$\chi^2(2, 116)=17.34$
District C				$p<0.001$*
FDK (N=75)	11% (8)	89% (67)	0	
HDK (N=69)	0	45% (31)	55% (38)	$\chi^2(2, 142)=11.48$
District E				$p=0.003$*
FDK (N=74)	1% (1)	19% (14)	79% (58)	
HDK (N=26)	0	11% (3)	88% (23)	$\chi^2(1, 51)=2.19$
District G				$p=0.14$
FDK (N=25)	0	28% (7)	72% (18)	

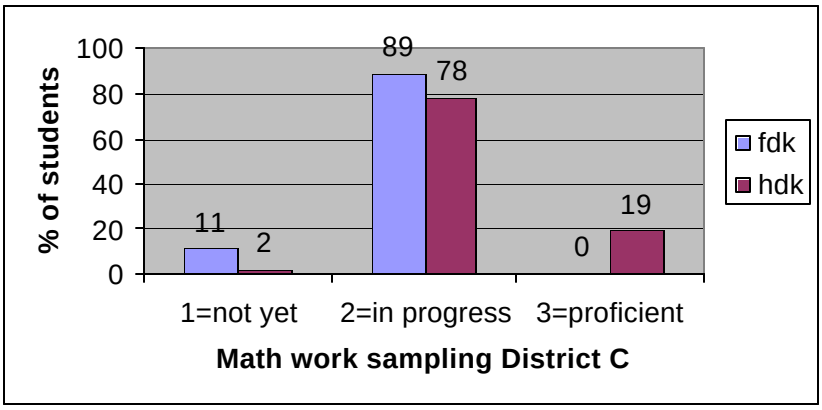

Figure 2. FDK and HDK math work sampling in District C.

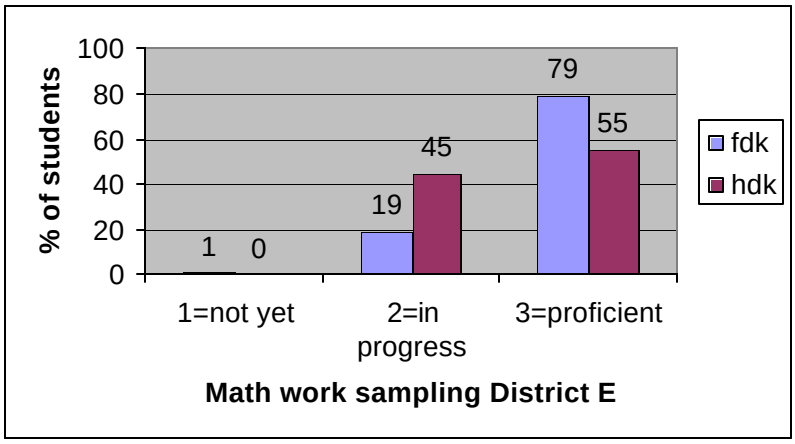

Figure 3. FDK and HDK math work sampling in District E.

SUMMARY AND IMPLICATIONS

Summary of Results

This study identified a small number of statistically significant differences in the performance of HDK and FDK students on DSTP assessments.

In the 99-00 FDK longitudinal study:

- The mean aggregated grade 2 DSTP2 reading scaled score for the HDK group is significantly higher than for the FDK group ($t\{354\}=1.9$, $p=.05$) [Table 2]. There is *not* a statistically significant difference in the reading progress indicators for the HDK and FDK groups (Table 3).
- There are no statistically significant differences between the HDK and FDK groups in the mean aggregated grade 3 DSTP reading and math scaled scores (Table 4), or in the aggregated reading, math, and writing performance levels (Table 5). The higher mean aggregated grade 3 DSTP math scaled score for the HDK group approaches statistical significance ($t\{356\}=1.9$, $.05< p<.06$) [Table 4].
- At the district level, the mean DSTP2 math scaled score for the HDK group in District C is significantly greater than the mean FDK score ($t\{34\}=2.9$, $p=.007$) [Table 7]. A higher percentage of HDK than FDK students in District C received a math progress indicator of 3 ("satisfactory"), but this difference is not statistically significant ($\chi^2\{1, 36\}=2.88$, $p=0.09$) [Table 9].

- There are not statistically significant differences at the district level between the HDK and FDK groups in the grade 3 DSTP1 reading and math scaled scores, or in the reading, math, and writing performance levels (Tables 10-13).

In the 02-03 kindergarten work sampling study:

- There is not a statistically significant difference in the aggregated reading work sampling scores for the HDK and FDK groups (χ^2 {2, 578}=2.64, p=0.27) [Table 17].
- There is a statistically significant difference in the aggregated FDK and HDK math work sampling scores (χ^2 {2, 567}=6.07, .04<p<.05) [Table 17]. This difference is primarily due to the higher frequency of scores of 1 ("not yet") in the FDK compared to the HDK group.
- At the district level, FDK students in District E were more likely than HDK students to receive a reading work sampling score of 3 ("proficient") rather than 2 ("in process") [Table 18 & Figure 1].
- Also in District E, FDK students were more likely than HDK to receive a math work sampling score of 3 ("proficient") rather than 2 ("in process") [Table 19 & Figure 3].
- In District C, FDK students were more likely than HDK students to receive math scores of 1 ("not yet") and 2 ("in process") rather than 3 ("proficient") [Table 19 & Figure 2].

Interpretations and Implications

With the exception of 02-03 kindergarten reading and math work sampling in District E, FDK students in this study did not perform better on DSTP assessments than students in the HDK comparison groups. HDK students performed significantly better than the FDK students on the aggregated grade 2 DSTP reading scaled score, on the grade 2 DSTP math scaled score in District C, on the aggregated 02-03 kindergarten math work sampling score, and on the 02-03 kindergarten math work sampling score in District C. The trend in the remaining data is that students in the HDK comparison groups tended to outscore students in the FDK groups, but at levels that are not statistically significant. These results can inform current policy discussions of FDK in Delaware, but they need to interpreted in the context of other research on FDK, and with the limitations of this study clearly in mind.

Perspectives from Research on FDK. Some themes emerge from research studies on the impact of FDK that may help explain the results of this study (see Fifield and Shepperson, 2004, for a review of research on FDK). Puleo (1988) argues that FDK programs with the most impact are purposeful, focused, and coherent full-day instructional programs, not merely extensions of existing HDK programs. FDK programs with documented impacts, such as the program in Montgomery County, Maryland, are notable

for their systemic approaches to developing and implementing an alternative to HDK (Bridges-Cline et.al. 2002; Larson, 2003). Phase I of this study suggested that some FDK programs in Delaware are extensions of existing HDL practices, rather than new approaches in response to new expectations. (Fifield and Shepperson, 2004). Perhaps FDK programs in Delaware can achieve ambitious results, such as eliminating achievement gaps in the early grades and beyond, only through an equally ambitious and carefully considered reform of kindergarten education. Further, the long-term impacts of FDK programs remain unclear (Clark, 2001). In his research review, Elicker (2000) concludes that there is not strong evidence that achievement gains from FDK will persist beyond first grade for all students. Even if well-articulated FDK programs are in place, it is reasonable to expect that complementary educational programs will also be needed in later grades to sustain and extend the progress children achieve in kindergarten.

Thinking Beyond the Limits of this Study. The results of this study must also be interpreted in light of its design limitations. For example, although HDK students tend to outperform FDK students in this study, we have no reason to believe that the quality of FDK instruction was inferior to that in HDK classrooms. One explanation for the apparent absence of a positive impact by FDK on DSTP scores is that the demographic variables used to match the HDK and FDK groups did not yield valid comparison groups. A shortcoming of the data available to us related to students' preschool educational experiences, and their academic performance upon entry to kindergarten. Studies of early childhood experiences in Delaware document that the quality of early learning can impact children's subsequent school performance (Gamel-McCormick & Amsden, 2002). Incorporating pre-school experience and performance variables in the selection of the HDK comparison groups would likely strengthen the validity of the subsequent analyses of HDK versus FDK performance. Future studies of FDK programs in Delaware will benefit if these data are systematically collected and organized for evaluation purposes.

Another interpretive caveat concerns the use of DSTP scores to assess the impact of FDK. DSTP scores are one among many ways to judge the educational impact of FDK. DSTP assessments are an appropriate measure of some effects, but they do not, and are not intended to, capture the diversity of outcomes that are valued in public education. Although the evidence in this study that FDK positively impacts DSTP scores is very limited, this does *not* suggest that the FDK programs studied have no beneficial educational effects. On the contrary, phase I of this study describes the views of teachers and administrators who, based on firsthand experience, believe that their FDK programs have academic, developmental, and social benefits for children (Fifield and Shepperson, 2004). Teachers and others who are close to the richness and complexity of children's classroom experiences are well positioned to evaluate the multiple ways that FDK programs can impact student learning. In this context of many

'ways of knowing' about the effects of educational programs, the results of this study can complement and inform other perspectives on the nature and quality of FDK in Delaware.

Policy Considerations

- What are the characteristics of exemplary FDK programs?
- How do exemplary FDK programs integrate academic, accountability-driven perspectives with child-centered, developmentally appropriate perspectives?
- How can FDK programs be coordinated with pre-school and elementary programs to produce the greatest impact for the all children?
- What data collection systems should be in place at the school, district, and state levels to support the ongoing evaluation of FDK in Delaware?

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APPENDIX A
District-level comparison groups for the 99-00 FDK longitudinal study

Table A1. District A 99-00 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=5)	HDK (N=4)
Gender	Male	80%	75%
	Female	20%	25%
Special Education		0%	0%
Title 1		0%	0%
Low Income		40%	25%
Limited-English Proficient		0%	0%
Race			
Black		40%	50%
Hispanic		20%	0%
White		40%	50%

Table A2. District B 99-00 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=54)	HDK (N=50)
Gender	Male	69%	66%
	Female	31%	34%
Special Education		15%	16%
Title 1		37%	32%
Low Income		32%	24%
Limited-English Proficient		0%	0%
Race			
Black		28%	30%
Asian/Pacific Islander		2%	2%
Hispanic		2%	2%
White		69%	66%

Table A3. District C 99-00 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=19)	HDK (N=18)
Gender	Male	42%	44%
	Female	58%	55%
Special Education		5%	6%
Title 1		26%	22%
Low Income		58%	57%
Limited-English Proficient		5%	5%
Race			
	Black	58%	61%
	Hispanic	26%	22%
	White	16%	17%

Table A4. District D 99-00 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=40)	HDK (N=37)
Gender	Male	75%	66%
	Female	25%	34%
Special Education		35%	16%
Title 1		95%	32%
Low Income		50%	24%
Limited-English Proficient		5%	0%
Race			
	Black	33%	27%
	Hispanic	20%	19%
	White	47%	54%

Table A5. District E 99-00 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=17)	HDK (N=14)
Gender	Male	53%	71%
	Female	47%	29%
Special Education		6%	0%
Title 1		0%	0%
Low Income		35%	36%
Limited-English Proficient		6%	0%
Race			
	Black	18%	14%
	Asian/Pacific Islander	12%	7%
	Hispanic	12%	7%
	White	58%	71%

Table A6. District F 99-00 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=17)	HDK (N=17)
Gender	Male	41%	41%
	Female	59%	59%
Special Education		12%	12%
Title 1		82%	82%
Low Income		71%	71%
Limited-English Proficient		0%	0%
Race			
	Black	65%	65%
	Hispanic	29%	29%
	White	6%	6%

APPENDIX B
District-level comparison groups for the 02-03 kindergarten work sampling study

Table B1. District B 02-03 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=132)	HDK (N=48)
Gender	Male	60%	48%
	Female	40%	52%
Special Education		0%	8%
Title 1		64%	66%
Low Income		39%	12%
Limited-English Proficient		0%	0%
Race			
	Black	23%	17%
	Asian/Pacific Islander	2%	2%
	Hispanic	4%	6%
	White	70%	75%

Table B2. District C 02-03 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=77)	HDK (N=43)
Gender	Male	56%	53%
	Female	44%	47%
Special Education		14%	21%
Title 1		25%	44%
Low Income		82%	74%
Limited-English Proficient		47%	5%
Race			
	Black	49%	88%
	Hispanic	49%	9%
	White	1%	2%

Table B3. District E 02-03 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=74)	HDK (N=69)
Gender	Male	53%	62%
	Female	47%	38%
Special Education		0%	0%
Title 1		0%	0%
Low Income		32%	27%
Limited-English Proficient		8%	3%
Race			
	Black	17%	17%
	Asian/Pacific Islander	3%	1%
	Hispanic	7%	3%
	White	73%	78%

Table B4. District G 02-03 FDK cohort and HDK comparison group demographics.

Demographic Characteristics		FDK (N=27)	HDK (N=26)
Gender	Male	33%	35%
	Female	67%	65%
Special Education		4%	0%
Title 1		0%	0%
Low Income		11%	12%
Limited-English Proficient		0%	4%
Race			
	Black	19%	15%
	Hispanic	7%	8%
	White	74%	77%