E D M O N T O N P U B L I C S C H O O L S

June 14, 2004

TO: Board of Trustees

FROM: A. McBeath, Superintendent of Schools

SUBJECT: Full-day Kindergarten: Longitudinal Effects Through to Grade Two

ORIGINATOR: B. Holt, Executive Director, Instructional and Curricular Support Services

RESOURCE STAFF: Carolyn Baker, Susan Bell, Gloria Chalmers, Mike Falk, Anne Mulgrew, Edgar Schmidt, Lorie Welk

INFORMATION

Background: With the introduction of full-day kindergarten at Norwood School in 1998–1999, a partnership was developed with Dr. Joe da Costa, Professor of Educational Policy Studies at the University of Alberta, to study the effect of this strategy. Dr. da Costa, with assistance from Susan Bell, Consultant, Reading Recovery and Early Childhood Education in the district, has continued this work. The first year of the research focused on comparing the outcomes of the Norwood School full-day kindergarten program with those of another city centre half-day kindergarten program. In 1999–2000, a second full-day kindergarten was introduced and the study compared the literacy effects of full-day kindergarten in these two schools versus half-day in another school (the comparison school had two classes of half-day kindergarten). The expansion in 2000–2001 of full-day kindergarten to 15 schools through AISI funding, provided an opportunity to include significant numbers of students in the study, to meet an AISI requirement for evaluation and to assist the district in quantifying the range of student literacy preparedness when entering kindergarten. This study was conducted between 2001 and 2003.

The Longitudinal Study: The study addressed the following question:

> What are the longitudinal reading and writing effects of full-day kindergarten on students at the end of kindergarten, grade one, and grade two levels?

The primary finding from the longitudinal study is that full-day Kindergarten for low socio-economic status (SES) students makes a positive difference for them at least until the end of grade two. These are the neediest students and they appear to benefit from this programming enhancement for at least three years. The full report, written by Dr. da Costa of the University of Alberta, (Appendix I) is provided and highlights these and other findings for these three cohort groups.

Next Steps: A summary of this report will be made available to all district staff through the intranet Web site. In addition, a follow-up report that includes the 2003-2004 HLAT reading and writing results for all the cohort groups in the study and the Provincial Achievement Test results for the initial group of Kindergarten students will be provided to the Board.

ES:mp

APPENDIX I – Full-day Kindergarten: Longitudinal Effects Through to Grade Two

APPENDIX I

Full-day Kindergarten: Longitudinal Effects Through to Grade Two[1]

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Existing Research and Literature

West, Denton, and Germino-Hausken (2000) asserted that of the approximately 4 million children attending kindergarten in the United States in the 1998–99 school year, 55 percent were enrolled in all-day programs. While 40 states mandated public school jurisdictions to offer kindergarten programs in 2003, only 10 states (these are Alabama, Arkansas, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, and West Virginia) required that jurisdictions offer full-day kindergarten programs. In Canada, all provinces require public (and separate school jurisdictions where they exist) school jurisdictions to offer kindergarten programming. Only Quebec and New Brunswick (require school jurisdictions to offer full-day kindergarten programming, and only the later mandates that all children must attend full-day kindergarten programs. In both Canada and the United States, regardless of legislation, individual jurisdictions and even schools within jurisdictions offer full-day kindergarten programs to their students, these are often funded by community donors, limited duration operating grants, or by shifting resources from other programs and grade levels to support full-day kindergarten. These full-day programs are often put into place to address the needs of children from socially impoverished backgrounds.

Considerable research has been conducted on kindergarten programs both nationally and internationally since the 1970s; unfortunately much of this work has resulted in mixed findings. Puleo (1988), Fusaro (1997), and Coladarci and Ervin (2000) have all argued that the early research from the 1970s and 1980s suffered from inadequate methodological standards with poor internal and external validity. Although still mixed, research conducted in the 1990s does show more consistently that children attending full-day kindergarten programs outperform their half-day counterparts, particularly in academic achievement of at-risk students (Clark, 2002; Cryan, Sheehan, Wichel, & Bandy-Hedden, 1992; Elicker & Mathur, 1997; Hough & Bryde, 1996, Koopmans, 1991).

Much of the research on full-day kindergarten in the 1990s and early in the 2000s has also focused on kindergarten curricula and on student time spent in kindergarten (e.g., da Costa & Bell, 2000, 2001; Fusaro, 1997; Ohio State Legislative Office of Education Oversight, 1997; Rothenberg, 1995). In a review of the literature, Corter and Park (1993) found agreement among teachers, principals, consultants, and parents regarding what constituted exemplary kindergarten practice; they noted six principles exhibited in exemplary programs:

1. underpinning the kindergarten program of studies should be a play-based child-centred philosophy;
2. the focus of the program should be on the *whole* child;
3. the child should be placed in the social context;

[1] I would like to acknowledge and thank Edmonton Public Schools, especially Mr. Edgar Schmidt and Ms. Gloria Chalmers, for enabling this research to proceed by providing not just access to data, but resources to obtain those data.

4. parents and administrators should recognize and support the teacher;
5. all interest groups should work towards structured and balanced programs; and
6. schools and society in general should provide support for kindergarten.

These principles were supported by da Costa and Bell (2000, 2001, 2002, 2003, 2004) who focused on exemplary kindergarten programs in a Canadian context.

Corter and Park (1993) make no mention of the academic or social effects of lengthening instructional time in kindergarten. The literature reports many reasons for varying the length of the school day for kindergarten children. In support of full-day programs, the reasons range from "eliminating the need to provide buses and crossing guards at mid-day" (Rothenberg, 1995), to "providing an academic advantage to all students (Ohio State Legislative Office of Education Oversight, 1997). A review of the literature does, generally, support the notion that full-day kindergarten provides an academic advantage for students. Alber-Kelsay's (1998) study of 77 children in East Brunswick Public School District in New Jersey, found that those grade one children who had attended full-day kindergarten scored higher than their half-day counterparts as measured on all areas of the standardized portfolio assessment measuring instrument. Furthermore, these students performed particularly well on the Developmental Spelling Assessment sub-test of the standardized portfolio. In another longitudinal study spanning three years, Koopmans (1991) found that the long-term effect of attending an all-day kindergarten program provided grade one students with a significant academic advantage over their counterparts who attended half-day kindergarten. These results are supported by Fusaro's (1997) meta-analysis of kindergarten research which found that "overall, students who attended full-day kindergarten manifested significantly greater achievement than half-day attendees. The U.S. Department of Education's National Center for Educational Statistics (NCES) is currently following a nationally representative sample of children from kindergarten (in 1998/99) to grade five (in 2004/05). Preliminary analyses of the fall-spring assessment results in reading and mathematics reveal the full-day kindergarten students to have achieved 0.12 standard deviations higher in both subject areas than the sample's half-day kindergarten students after adjusting for child, family, and classroom characteristics (Walston, West, & Rathbun, 2002). A variety of other small-scale or program evaluations generally support the notion of the academic benefits realized by full-day kindergarten students (e.g., Coladarci & Ervin, 2000; Cryan et al., 1992; da Costa & Bell, 2000, 2001, 2002, 2003, 2004; Elicker & Mathur, 1997; Hough & Bryde, 1996).

Some debate does appear in the literature regarding who might best benefit from full-day kindergarten. Housden and Kam (1992) and Fromboluti (1988) both argue that a developmentally appropriate full-day kindergarten program benefits all children both academically and socially, but it is especially beneficial to children from low socioeconomic (SES) or educationally disadvantaged backgrounds. da Costa and Bell's (2000, 2001, 2002, 2003, 2004) research demonstrated that, by the end of the kindergarten year, children attending full-day kindergarten programs consistently outperform children attending half-day kindergarten programs on Clay's Observation Survey sub-scales which measure emergent readers' abilities to read and write English. da Costa and Bell's work does seem to suggest that children from educationally disadvantaged families have the most to benefit from full-day kindergarten programming. This view is also supported by Clark (2002), and Clark and Kirk (2000).

Purpose of the Research

As in all regions around the world, in Alberta, a variety of models are used for delivery of kindergarten curricula. The most predominant model has kindergarten children in school every day, 2.5 to 3 hours per day. Some jurisdictions opt to offer their kindergarten programming every other day for full days. Both of the preceding models provide students with approximately 500 hours of instructional time per school year. The province of Alberta currently funds school jurisdictions for 475 hours of kindergarten programming per year. A third model, the focus of this paper provides students with approximately 6 hours of instructional time every day for the entire school year (approximately 1000 contact hours). The present study reports on longitudinal comparisons, through grade two, drawn between students who attended a full-day kindergarten program and a half-day kindergarten program both offered in Edmonton Public Schools in Edmonton, Alberta. Additional funding enabling schools to offer full-day kindergarten programming came through the generosity of anonymous benefactors, shifting of resources from other programs and grades, and the use of "one-time" grants obtained from Alberta Learning. The present study addresses the question: What are the longitudinal reading and writing effects of full-day kindergarten on students at the end of kindergarten, grade one, and grade two levels?

Method

Sample

In the 2000/01 school year and then again in the 2001–02 school year, 15 schools, predominantly situated in low SES communities were identified by Edmonton Public Schools to offer full-day kindergarten programming to their students. In 2000/01, all elementary schools ranked, on the basis of community poverty and transience, by the district as being most needy (ranked between 1 and 14 out of 192 schools) were included (see table one for a breakdown of school district need ranking)[2]. Additionally, one school ranked between 21 and 30, a second ranked between 31 and 50, a third ranked between 51 and 90, and a fourth ranked over 90 were identified randomly within each strata to also offer full-day kindergarten programming. Due to school closures, in 2001/02, all elementary schools ranked between 1 and 12 were selected to offer full-day kindergarten programming. The schools ranked between 15 and 190 (out of 190 schools) that had offered full-day kindergarten in 2000/01 were once again provided resources to offer the program.

A comparison group of schools offering half-day kindergarten were also identified for both school years. Schools offering half-day kindergarten programming were chosen randomly and asked to volunteer by the school jurisdiction to form the comparison group. For the 2000/01 cohort, 13 schools participated in the study, while for the 2001/02 cohort, 12 schools with half-day kindergarten programming were included.

[2] Edmonton Public Schools ranks all of its schools annually on the basis of need so that additional funding can be provided to the 50 most needy schools in the district.

Table 1 School need as ranked by the jurisdiction.

	2000–01		2001–02	
	Full-day sample	Half-day sample	Full-day Sample	Half-day sample
1 - 10	9		9	
11 - 20	2	1	3	
21 - 30	1	2	1	1
31 - 40	1	1		
41 - 50				2
51 - 60				
61 - 70			1	1
71 - 80	1	2		
81 - 90		3		
91 - 100			1	2
101 - 110	1			
111 - 120				
121 - 130				
131 - 140				1
141 - 150		1		2
151 - 160		1		
161 - 170		1		1
171 - 180				
181 +		1		2

2000/01: 192 schools total in the jurisdiction
2001/02: 190 schools total in the jurisdiction

The 2000/01 cohort (cohort 1) initially consisted of 261 full-day kindergarten students and 293 half-day kindergarten students (see table 2). These numbers represent those students who had spent the entire school year in their respective classes. By the end of the 2002/03 school year, when cohort 1 students were finishing grade 2, the total number of students who had experienced full-day kindergarten had dropped to 195, while the total number of students who had experienced half-day kindergarten had dropped to 150. The 2001/02 cohort (cohort 2) had 291 students who had completed the entire year in their full-day kindergarten classroom and 241 students completing their entire year in half-day kindergarten. By the end of the 2002/03 school year, 233 students who had completed full-day kindergarten remained in the sample and 2001 students completing half-day kindergarten remained in the sample. The attrition in the numbers of students in cohort 1 and cohort 2 was due to student transience out of the Edmonton Public School jurisdiction. Student age on January 1 of 2001 for cohort 1 and 2002 for cohort 2 was just under 5.5 years for full-day and half-day students in both cohorts. Gender was equally distributed between the full-day and half-day students in both cohorts also.

Table 2 Sample size by year of Full-day Kindergarten Project.

	Cohort 1			Cohort 2		
	Full day (n =)	Half day (n =)	Total (n =)	Full day (n =)	Half day (n =)	Total (n =)
2000/01	261	293	554			
2001/02	196	151	347*	291	241	532
2002/03	195	150	345	233	201	434

*this is lower than it should be because of when the data were actually retrieved: November of 2003

Data Collection Instruments

Clay's Observation Survey. In their kindergarten year, data had been collected, using Clay's Observation Survey (Clay, 1993) from all full-day and half-day kindergarten children by district reading specialists. Sub-scales administered in October of the school year (pre-test) and in June of the school year (post-test) to all kindergarten students included: (a) book reading level, (b) letter identification, (c) readiness to read word test, (d) writing, (e) hearing and recording sounds, and (f) concepts about print. This test is appropriate for assessing emergent readers' reading skills. The test is administered individually and, towards the end of students' kindergarten year as their reading skills improve, the six test sub-scales can take up to 30 minutes to administer to each child by a skilled reading specialist.

Highest Level of Achievement Tests. Data were also collected by the school jurisdiction for cohort 1 at the end of grade one and grade two and for cohort 2 at the end of grade one using district developed and locally standardized Highest Level of Achievement Tests (HLAT) in reading and writing. The HLAT reading subtest consists of the Reading Comprehension sub-test of the Canadian Test of Basic Skills (CTBS). The writing sub-test of the HLAT is a locally developed writing prompt with standardized scoring rubrics applied by two different raters. Two HLAT results are reported for each student as having achieved above grade level, at grade level, or below grade level on the reading sub-test and on the writing sub-test. HLAT reading sub-test raw scores were also obtained for each student. The classroom teacher administers HLAT reading and writing prompts, both "paper and pencil" tests, in the classroom.

Data Analysis

Data collected in this study were analyzed using one of two approaches, depending on the type of data being analyzed. Interval data collected using the Clay's observation survey sub-tests and the raw scores from the HLAT reading sub-test were analyzed using ANOVA comparisons (alpha was set to .05 level). Ordinal data collected representing students' HLAT reading grades and writing grades were analyzed using Chi-square Goodness-of-fit tests.

To provide a sense of the importance of the findings, Cohen's d (effect size statistic) is calculated and provided for each of the ANOVA comparisons conducted on the pre-test and post-test data. Cohen's d is calculated by finding the difference between the mean score from the control (half-day kindergarten) group and the experimental (full-day kindergarten) group, then dividing the result by the pooled standard deviation of the two groups (an estimate of the population standard deviation). Cohen (1988, 1994) and many other educational researchers (e.g., Glass, McGaw, & Smith, 1981) have suggested that specific values be used to represent "small," "medium," and "large" effect sizes (ES) in social sciences and educational research. Effect size conventions are as follows:

small: ES less than or equal to 0.25
medium: ES from 0.26 to 0.55
large: ES greater than or equal to 0.56

The ES should represent the smallest effect that is of practical or educational significance. The suggested values, provided above, for "small," "medium," and "large" ES can be used as a reality-check for the researcher or policy analyst attempting to interpret and make sense of "the numbers."

Findings

The findings in this study are reported in three sub-sections. The first reports on the pre-test and post-test results obtained using Clay's Observation Survey at the kindergarten level for both cohorts 1 and 2. The second sub-section reports on the HLAT reading (grade level), writing (grade level), and reading (raw score) for cohorts 1 and 2 at the end of their respective grade one years. The second sub-section reports on the same HLAT scores as just described but only for cohort 1 students at the end of their grade two year.

Kindergarten Results

Aggregate pre-test results. Even after having spent slightly over one month in a kindergarten program, both full-day and half-day, cohort 1 and cohort 2 students were, for the most part, non-readers (see tables 3 and 4). On average, most children could identify some letters of the alphabet, although children in both cohorts were unable to identify any letters at the time of pre-testing. The vast majority of children were unable to read any words at this time. With regard to writing ability, approximately one-quarter of the students in both cohorts did not have a sufficient grasp of writing concepts at the time of entry to kindergarten to be able to obtain a score on the writing sub-test of Clay's Observation survey. Similarly, almost half of the children in this sample could not use any symbols to record sounds and words spoken to them. On a much more optimistic note, approximately 95% of the children in cohorts 1 and 2 at the time of the pre-testing understood the basic rules of Western print (i.e., written and read from top to bottom, left to right, letters form words, punctuation, the words rather than the pictures tell a story).

Table 3 Descriptive Statistics for all cohort 1 students obtained with Clay's Observation Survey as a pre-test.

Cohort 1	N	Min	Max	Mean	SD
Pre-test book reading level	554	0	22	.27	1.936
Pre-test letter identification	554	0	54	23.70	18.147
Pre-test ready to read word test	554	0	15	.74	2.120
Pre-test writing	554	0	26	2.40	3.384
Pre-test hearing and recording sounds in words	554	0	37	3.34	6.245
Pre-test concepts about print	554	0	22	7.34	4.187

Table 4 Descriptive Statistics for all cohort 2 students obtained with Clay's Observation Survey as a pre-test.

Cohort 2	N	Min	Max	Mean	SD
Pre-test book reading level	532	0	30	.32	2.078
Pre-test letter identification	532	0	54	24.74	17.903
Pre-test ready to read word test	532	0	15	.62	1.645
Pre-test writing	532	0	38	2.41	3.518
Pre-test hearing and recording sounds in words	532	0	37	3.49	5.996
Pre-test concepts about print	532	0	22	7.58	4.344

Aggregate post-test results. By the end of the 2000/01 school year for cohort 1 and the end of the 2001/02 school year for cohort 2, more than half of the children were reading at a beginning grade one level or higher as measured by Clay's (1993) Book Reading Level test (see tables 5 and 6). At the time of the post-testing, the vast majority of children in both cohorts could easily identify the letters of the alphabet in a variety of fonts and contexts. In fact only one child from the entire cohort 1 sample was unable to identify any letters during post-testing. Furthermore, more than 65% of the children in the sample were able to read some words from the "primer" series of Dolch word lists. Over 97% of children were able to demonstrate at least rudimentary writing skills. Just over 92% of children in this study were, by the beginning of June 2002, able to record sounds in words using symbols. Virtually all (99.5%) children in the sample understood the basic rules of Western print.

Table 5 Descriptive Statistics for all cohort 1 students obtained with Clay's Observation Survey as a post-test.

	N	Min	Max	Mean	SD
Post-test book reading level	554	0	23	1.73	3.927
Post-test letter identification	554	0	54	45.37	11.480
Post-test ready to read word test	554	0	15	3.43	4.432
Post-test writing	554	0	58	11.49	10.560
Post-test hearing and recording sounds in words	554	0	37	16.51	11.202
Post-concepts about print	554	0	24	13.48	5.127

Table 6 Descriptive Statistics for all cohort 2 students obtained with Clay's Observation Survey as a post-test.

	N	Min	Max	Mean	SD
Post-test book reading level	532	0	40	1.71	4.434
Post-test letter identification	532	1	54	44.59	12.251
Post-test ready to read word test	532	0	35	3.49	4.505
Post-test writing	532	0	60	10.98	10.687
Post-test hearing and recording sounds in words	532	0	49	15.18	11.547
Post-concepts about print	532	0	24	13.53	4.418

When comparing the results of the pre-tests from cohorts 1 and 2 with the results of the post-tests, it is clear that both cohorts of students, in both full-day and half-day programs, developed their understanding of the basic skills of reading and writing greatly over the course of the year. Of interest in this study are the effects of full-day programming and half-day programming on student achievement. Also of interest are achievement comparisons between only the full-day kindergarten, low SES students and the half-day kindergarten, higher SES students.

Pre-test comparisons: all SES levels aggregated. To explore the similarities and differences between the effects of full-day programming and half-day programming on children, in cohorts 1 and 2, a series of ANOVAs, each corresponding to one of Clay's Observation Survey subscales for which data were collected, were conducted as described in the method section of this paper.

As can be seen in the descriptive statistics provided in tables 7 (for cohort 1) and 8 (for cohort 2), both full-day and half-day kindergarten students in both cohorts were essentially non-readers at the beginning of their respective school years. However, in terms of the skills required to become emergent readers the children, in both cohorts 1 and 2, enrolled in half-day programs were much better equipped than their full-day kindergarten counterparts upon entry to kindergarten.

Table 7 Descriptive Statistics of cohort 1's pre-test data broken down by program.

	Group Composition			
	Full-day[1]		Half-day[2]	
Clay's Observational Sub-scale	*M*	*SD*	*M*	*SD*
Pre-test observations				
Book reading level	.19	1.499	.34	2.281
Letter identification	27.80	17.768	19.72	17.647
Ready to read word test	.90	2.204	.58	2.025
Writing	3.09	3.655	1.72	2.951
Hearing & recording sounds in words	4.56	6.700	2.15	5.525
Concepts about print	7.95	4.165	6.74	4.129

[1] N=273
[2] N=281

Table 8. Descriptive Statistics of cohort 2's pre-test data broken down by program.

	Group Composition			
	Full-day[1]		Half-day[2]	
Clay's Observational Sub-scale	*M*	*SD*	*M*	*SD*
Pre-test observations				
Book reading level	.45	2.570	.32	1.235
Letter identification	22.05	17.725	24.74	17.615
Ready to read word test	.56	1.781	.62	1.465
Writing	1.97	3.533	2.41	3.434
Hearing & recording sounds in words	2.60	5.585	3.49	6.300
Concepts about print	6.78	4.366	7.58	4.123

[1] N=291
[2] N=241

Using the Clay's Observation Sub-scale pre-tests for each cohort, a series of six ANOVAs was performed to explore the differences between the students shortly after entering their kindergarten programs. At the beginning of the 2000/01 school year for cohort 1 and at the beginning of the 2001/02 school year for cohort 2, there were no significant differences between the full-day kindergarten group and the half-day kindergarten group in terms of their book reading abilities. Cohort 2 also demonstrated no significant differences between the full-day and the half-day kindergarten students in their readiness to read words (see table 10). The half-day kindergarten group in Cohort 1, on the other hand, did display significantly (with a medium effect size) better ability in their readiness to read words at the beginning of the year than the full-day kindergarten group. On the remaining pre-tests, the half-day kindergarten group significantly (with large effect sizes) outperformed the full-day kindergarten group in their abilities to identify letters, write, hear and record sounds in words, and in their concepts about Western print (see table 7).

Table 9 Results of ANOVAs on cohort 1's pre-test measures of Clay's Observation Survey subscales by program group.

Pre-test measures comparing program groups	$F_{(1, 552)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	.873	.350			
Letter identification	54.887	.000	*	.63	Half-day
Ready to read word test	13.559	.000	*	.33	Half-day
Writing	55.753	.000	*	.67	Half-day
Hearing & recording sounds in words	50.629	.000	*	.64	Half-day
Concepts about print	57.428	.000	*	.65	Half-day

Table 10 Results of ANOVAs on cohort 2's pre-test measures of Clay's Observation Survey subscales by program group.

Pre-test measures comparing program groups	$F_{(1, 530)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	2.343	.126			
Letter identification	14.810	.000	*	.35	Half-day
Ready to read word test	.815	.367			
Writing	10.005	.002	*	.32	Half-day
Hearing & recording sounds in words	14.730	.000	*	.38	Half-day
Concepts about print	22.829	.000	*	.45	Half-day

Post-test comparisons: all SES levels aggregated. Similar comparisons using ANOVA were conducted on the Clay's Observation Sub-scale post-test data collected at the end of the school years for cohorts 1 and 2. With the exception of book reading level, in this set of comparisons the trend observed in the pre-test comparisons entirely reversed itself with the full-day kindergarten students, most of whom were from predominantly low SES communities, outperforming (although only significantly so for only two sub-tests with cohort 1) their half-day, higher SES counterparts (see tables 11 and 12). Although the effect sizes shown in tables 11 and 12 fall into the small to medium magnitude, it should not be forgotten that, with the exception of book reading level, the full-day kindergarten students started well behind the performance of the half-day students at the beginning of the school year. Furthermore, it should not be forgotten that the comparisons made using the pre-test data also showed moderate to large effect sizes in favour of the half-day group on 9 out of 12 of these same sub-test comparisons.

Table 11 Results of ANOVAs on cohort 1's post-test measures of Clay's Observation Survey subscales by program group.

Post-test measures comparing program groups	$F_{(1, 552)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	.212	.645			
Letter identification	2.259	.133			
Ready to read word test	.575	.449			Full-day
Writing	5.183	.023	*	.19	Full-day
Hearing & recording sounds in words	8.527	.004	*	.25	Full-day
Concepts about print	3.639	.057			Full-day

Table 12 Results of ANOVAs on cohort 2's post-test measures of Clay's Observation Survey subscales by program group.

Post-test measures comparing program groups	$F_{(1, 530)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	1.496	.222			
Letter identification	9.526	.002	*	.31	Full-day
Ready to read word test	7.122	.008	*	.26	Full-day
Writing	4.109	.043	*	.20	Full-day
Hearing & recording sounds in words	18.129	.000	*	.40	Full-day
Concepts about print	18.599	.000	*	.42	Full-day

An examination of the data collected at the end of cohort 1 and 2's respective kindergarten years suggests that the full-day kindergarten students had maintained their growth at par with that of the other students in terms of their actual reading ability as measured by Clay's book reading level test (see table 6). The full-day kindergarten students in cohort 1 were also able to score slightly higher on letter identification, readiness to read word test, and concepts about print than their half-day counterparts, however not significantly so. On all other comparisons drawn between the full-day kindergarten students and the half-day kindergarten students the former significantly outperformed the latter demonstrating small to moderate effect size gains. The reader is reminded that these same students had scored much more poorly in their pre-tests than the half-day kindergarten students who had demonstrated moderate to large effect size differences at the beginning of the year. The gains demonstrated by the full-day kindergarten children in cohorts 1 and 2 on all of Clay's Observation sub-tests, with the exception of book reading level, are astounding. Although a case could be made for arguing that the full-day kindergarten children in both cohorts are quite representative of low SES children in the jurisdiction, this would not be entirely correct. The following sub-sections will compare only the very low SES full-day kindergarten students' results with the medium to high SES half-day kindergarten students to address the issue of the effects of full-day kindergarten on low SES students.

Pre-test comparisons: low SES full-day kindergarten compared with higher SES half-day kindergarten. As outlined previously, the present and the next sub-sections will compare only the very low SES full-day kindergarten students' results with the medium to high SES half-day kindergarten students to address the issue of the effects of full-day kindergarten on low SES students. In subsequent exploration of the low SES, full-day and high SES, half-day kindergarten data, comparisons were made between only those schools serving communities ranked between 1 and 20 on the district's "high needs (very low SES) scale and those serving communities ranked over 90 on the same needs scale (see table 1 for a distribution of schools ranked by need). The range of schools included in the high SES, half-day kindergarten group is quite broad out of necessity to maintain a sufficiently large comparison group sample size.

An examination of the gender distribution revealed that it was still equally distributed between full-day and half-day programs in these schools. Similarly, the age distribution changed insignificantly from that found in the overall group.

As can be seen in the descriptive statistics provided in tables 13 (cohort 1) and 14 (cohort 2) and in the ANOVA comparison provided in tables 15 (cohort 1) and 16 (cohort 2), both sets of students from these schools essentially mirror the pre-test descriptive results and the pre-test ANOVA comparisons already reported in the previous section of this report. To reiterate, with the exception of book reading level, all half-day, higher SES students significantly outperformed the low SES full-day kindergarten students in both cohorts on Clay's Observation Survey sub-tests after being in kindergarten for one month. In fact, of the 10 comparisons in which there were significant differences, half showed a moderate effect size and the other half showed a large effect size. These ANOVAs show that children attending schools from higher SES communities brought a significantly broader knowledge of reading skills upon entering kindergarten than did the students enrolling in the lowest SES community schools

Table 13 Descriptive Statistics of cohort 1's pre-test data broken down by SES/program.

	Group Composition			
	Low SES/Full-day[1]		High SES/Half-day[2]	
Clay's Observational Sub-scale	*M*	*SD*	*M*	*SD*
Pre-test observations				
Book reading level	.13	1.669	.20	1.651
Letter identification	16.36	15.847	30.50	18.622
Ready to read word test	.33	1.222	1.25	2.723
Writing	1.13	1.527	3.71	4.215
Hearing & recording sounds in words	.92	2.462	5.77	7.751
Concepts about print	6.33	3.640	8.42	4.216

[1] N=174
[2] N=128

Table 14 Descriptive Statistics of the pre-test and post-test data broken down by SES/program.

	Group Composition			
	Low SES/Full-day[1]		High SES/Half-day[2]	
Clay's Observational Sub-scale	*M*	*SD*	*M*	*SD*
Pre-test observations				
Book reading level	.32	1.483	.21	1.490
Letter identification	19.87	17.736	31.03	17.307
Ready to read word test	.38	1.422	.84	1.648
Writing	1.78	3.425	3.45	3.778
Hearing & recording sounds in words	2.07	5.029	5.18	6.424
Concepts about print	6.39	4.302	9.43	4.065

[1] N=214
[2] N=159

Table 15 Results of ANOVAs on cohort 1's pre-test measures of Clay's Observation Survey subscales by Low SES/Full day group vs. Higher SES/Half day group.

Pre-test measures comparing program groups	$F_{(1, 300)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	.106	.744			
Letter identification	50.588	.000	*	.82	Higher SES
Ready to read word test	15.683	.000	*	.47	Higher SES
Writing	55.568	.000	*	.90	Higher SES
Hearing & recording sounds in words	59.875	.000	*	.95	Higher SES
Concepts about print	21.211	.000	*	.53	Higher SES

Table 16 Results of ANOVAs on cohort 2's pre-test measures of Clay's Observation Survey subscales by Low SES/Full day group vs. Higher SES/Half day group.

Pre-test measures comparing program groups	$F_{(1, 371)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	.487	.486			
Letter identification	36.811	.000	*	.61	Higher SES
Ready to read word test	8.316	.004	*	.30	Higher SES
Writing	19.872	.000	*	.46	Higher SES
Hearing & recording sounds in words	27.615	.000	*	.53	Higher SES
Concepts about print	47.915	.000	*	.68	Higher SES

Post-test comparisons: low SES full-day kindergarten compared with higher SES half-day kindergarten. Once again, the gains made by the full-day, although now only from low SES communities, kindergarten students are quite remarkable given where they started at the beginning of the school year relative to the half-day, higher SES students (see tables 17 and 18). An examination of the post-test data, using ANOVAs to analyze the same six Clay's Observational Survey sub-tests for each cohort, shows that, just as was the case with the overall group, the low SES children attending full-day kindergarten were able to catch up to and then keep pace with their initially better equipped higher SES peers attending half-day kindergarten programs by the end of the school year (see tables 19 and 20).

Table 17 Descriptive Statistics of the cohort 1's post-test data broken down by SES/program.

	Group Composition			
	Low SES/Full-day[1]		High SES/Half-day[2]	
Clay's Observational Sub-scale	*M*	*SD*	*M*	*SD*
Post-test observations				
Book reading level	1.48	3.284	1.95	4.361
Letter identification	45.63	10.515	46.44	10.534
Ready to read word test	3.19	4.065	3.85	4.762
Writing	10.65	9.252	10.95	8.766
Hearing & recording sounds in words	16.09	10.702	15.95	11.713
Concepts about print	13.58	3.698	13.04	4.011

[1] N=174
[2] N=128

Table 18 Descriptive Statistics of the cohort 2's post-test data broken down by SES/program.

	Group Composition			
	Low SES/Full-day[1]		High SES/Half-day[2]	
Clay's Observational Sub-scale	*M*	*SD*	*M*	*SD*
Post-test observations				
Book reading level	1.50	3.327	1.53	3.841
Letter identification	45.43	11.069	44.81	12.590
Ready to read word test	3.42	4.593	3.65	4.330
Writing	10.53	10.103	11.94	10.529
Hearing & recording sounds in words	16.16	11.298	14.89	11.377
Concepts about print	14.09	4.553	13.19	4.148

[1] N=214
[2] N=159

Table 19 Cohort 1 results of ANOVAs on post-test measures of Clay's Observation Survey subscales by Low SES/Full day group vs. Higher SES/Half day group.

Post-test measures comparing program groups	$F_{(1, 300)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	1.143	.286			
Letter identification	.438	.509			
Ready to read word test	1.710	.192			
Writing	.083	.773			
Hearing & recording sounds in words	.013	.910			
Concepts about print	1.471	.226			

Table 20 Cohort 2 results of ANOVAs on post-test measures of Clay's Observation Survey subscales by Low SES/Full day group vs. Higher SES/Half day group.

Post-test measures comparing program groups	$F_{(1, 371)}$	Sig	Sig at .05 level	Effect Size (Cohen's d)	Higher performing group
Book reading level	.009	.926			
Letter identification	.257	.612			
Ready to read word test	.244	.622			
Writing	1.716	.191			
Hearing & recording sounds in words	1.147	.285			
Concepts about print	3.844	.051			

Grade One HLAT Results

The analyses reported in this sub-section are based on HLAT reading and writing data collected in the grade one years from the cohort 1 (grade one in 2001/02) and cohort 2 (grade one in 2002/03) students, who had had a full-day kindergarten experience. The grade level comparisons focus on (a) the expected proportions of students, who attended full-day kindergarten, achieving at or above grade level relative to district expectations overall; and (b) the expected proportions of students, who attended full-day kindergarten in schools ranked between 1 and 17 on the basis of need, achieving at or above grade level relative to district expectations overall.

Writing grade level. Two sets of Chi-square Goodness of Fit comparisons are provided in this section to best give a sense of the HLAT accomplishments of the writing grade level achieved. The first compares the observed percentages of students, who had experienced full-day kindergarten in their previous year, achieving at or above writing grade level to the observed percentages of students throughout the school jurisdiction achieving at or above grade level on the same test. The second comparison contrasts the proportion of students achieving at or above grade level who had attended high need schools (schools ranked between 1 and 17) for their full-day kindergarten experience with the proportion of students from throughout the district achieving at or above grade level on the HLAT writing prompt.

When the proportion of cohort 1 students achieving at or above grade level, who also had experienced full-day kindergarten in their previous year, was compared to the district expected proportions of students achieving at or above grade on the HLAT writing prompt using Chi-square, a significant difference was found (Chi-square = 8.937, sig = .003) at the .05 alpha level. Significantly more students having experienced full-day kindergarten achieved at grade level or higher on the HLAT writing prompt than was the case throughout the district (see table 21). However, when the same comparison was made for cohort 2 the results, although still positive, were not as dramatic as found for cohort 1. For cohort 2 the number of students achieving at or above grade level was the same as the proportion of students achieving at or above grade level on the HLAT writing prompt from throughout the district (see table 21).

Table 21 Chi-square comparisons between students in cohorts 1 and 2 who had experienced full-day kindergarten and all students in district for the grade one HLAT writing prompt.

	Full-day observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	175 (82.9%)	155.9 (73.9%)	8.937	.003	Full-day K.
Cohort 2	198 (85.0%)	199.2 (85.5%)	0.051	.821	neither

To address the question of how the low SES, full-day kindergarten students from cohorts 1 and 2 compared to the district results, all of the HLAT writing prompt data from students who had experienced full-day kindergarten in schools ranked between 1 and 17 were compared to those obtained by the district in the corresponding years. The results (see table 22) were virtually a replication of those just described above with cohort 1, low SES students achieving grade level at a significantly higher rate than the district as a whole (Chi-square = 4.918, sig = .027) and cohort 2, low SES students obtaining grade level or higher at rates similar (Chi-square = 0.229, sig = .632) to the entire school jurisdiction (see table 22).

Table 22 Chi-square comparisons between students in cohorts 1 and 2 who attended full-day kindergarten in schools ranked between 1 and 17 in terms of need and all students in district for the grade one HLAT writing prompt.

	Full-day, low SES observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	122 (81.9%)	110.1 (73.9%)	4.918	.027	Full-day K. low SES
Cohort 2	144 (84.2%)	146.2 (85.5%)	0.229	.632	neither

Reading grade level. Paralleling the comparisons described above are two sets of comparisons drawing on the HLAT reading sub-test. The first comparison contrasts the actual proportion of students in cohorts 1 and 2 achieving at grade level or higher who attended full-day kindergarten programs with the expected proportion of students achieving grade level or higher in the district as a whole on the HLAT reading sub-test. The second comparison is identical except that only those students who attended full-day kindergarten programs in high needs schools (those ranked between 1 and 17) are contrasted with district results.

Although a slightly larger proportion of students, in both cohort 1 (Chi-square = 0.268, sig = .605) and 2 (Chi-square = 3.462, sig = .063), experiencing full-day kindergarten than grade one students on the whole in the district achieved at or above grade level as measured by the HLAT reading sub-test, the differences were not sufficiently large to be significant (see table 23).

Table 23 Chi-square comparisons between students in cohorts 1 and 2 who had experienced full-day kindergarten and all students in district for the grade one HLAT reading sub-test.

	Full-day observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	183 (87.1%)	180.4 (85.9%)	0.268	.605	neither
Cohort 2	215 (90.7%)	205.2 (86.6%)	3.462	.063	neither

Comparing the proportion of students achieving at or above reading grade level who had been in full-day kindergarten low SES (high needs) schools to the proportion of students reading at or above grade level in the district reveals that Cohort 1 students performed slightly better (see table 24), but not significantly, than the remainder of the district (Chi-square = 0.546, sig = .460). Cohort 2, on the other hand, performed significantly (alpha = .05 level) better in its rate of grade level or better achievement than the district (Chi-square = 4.397, sig = .036) (see table 24).

Table 24 Chi-square comparisons between students in cohorts 1 and 2 who attended full-day kindergarten in schools ranked between 1 and 17 in terms of need and all students in district for the grade one HLAT reading sub-test.

	Full-day, low SES observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	132 (88.0%)	128.8 (85.9%)	0.546	.460	neither
Cohort 2	161 (92.0%)	151.6 (86.6%)	4.397	.036	Full-day K. low SES

Grade Two HLAT Results

The analyses reported in this sub-section are based on HLAT reading and writing data collected from the full-day kindergarten experience cohort 1 students at the end of their grade two year (2002/03). As was the case in the previous sub-section, the comparisons focus on (a) the expected proportions of students, who attended full-day kindergarten, achieving at or above grade level relative to district expectations overall; and (b) the expected proportions of students, who attended full-day kindergarten in schools ranked between 1 and 17 on the basis of need, achieving at or above grade level relative to district expectations overall.

Writing grade level. Two Chi-square Goodness of Fit tests were once again conducted to compare the rates of achievement at or above grade level with the district for (a) all cohort 1 students who had received full-day kindergarten two years earlier, and (b) cohort 1 students who had received full-day kindergarten in schools ranked between 1 and 17 in terms of need two years earlier. The first comparison reveals no significant difference (Chi-square = 0.006, sig = .941) between the proportion of students in the full-day kindergarten comparison group's level of achievement at or above grade level and the district expected level achievement at or above grade level on the grade 2 HLAT writing prompt (see table 25).

Table 25 Chi-square comparisons between students in cohort 1 who had experienced full-day kindergarten and all students in district for the grade two HLAT writing prompt.

	Full-day observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	182 (90.5%)	182.3 (90.7%)	0.006	.941	neither

A second Chi-square Goodness of Fit test compared the proportion of students, who attended full-day kindergarten in low SES schools, achieving at or above grade level on the grade two HLAT writing prompt with district levels of achievement. Once again, the observed proportions of students achieving at or above grade level was virtually identical to the rates experienced by the district as a whole (Chi-square = 0.081, sig = .776) (see table 26).

Table 26 Chi-square comparisons between students in cohort 1 who had experienced full-day kindergarten in high needs schools (ranked between 1 and 17) and all students in district for the grade two HLAT writing prompt.

	Full-day observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	126 (90.0%)	127.0 (90.7%)	0.081	.776	neither

Reading grade level. To parallel the grade two HLAT writing grade level comparisons just described, this section describes two Chi-square Goodness of Fit tests comparing the grade two reading rates of achievement at or above grade level with the district for (a) all cohort 1 students who had received full-day kindergarten two years earlier, and (b) cohort 1 students who had received full-day kindergarten in schools ranked between 1 and 17 in terms of need two years earlier. Both sets of comparisons revealed that there were no significant differences in the proportions of students achieving or exceeding grade level when compared to the district results. This is very encouraging since the low SES students were able to maintain pace with the entire jurisdiction.

Table 27 Chi-square comparisons between students in cohort 1 who had experienced full-day kindergarten and all students in district for the grade two HLAT reading sub-test.

	Full-day observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	166 (81.8%)	174.6 (86.0%)	3.012	.083	neither

Table 28 Chi-square comparisons between students in cohort 1 who had experienced full-day kindergarten in low SES schools (those ranked between 1 and 17 in terms of district need) and all students in district for the grade two HLAT reading sub-test.

	Full-day observed number at or above grade level N (%)	Expected number at or above grade level based on district results Expected N (%)	Chi-square	Sig.	Higher performing group
Cohort 1	117 (82.4%)	122.1 (90.7%)	1.533	.216	neither

Summary of Findings

A large number of findings present themselves in this study. Most of these are clearly evident in tables 29 and 30 which summarize the study in two ways: (a) table 29 focuses on the effects of full-day kindergarten on all students who participated in the study, (b) table 30 focuses on the effects of full-day kindergarten exclusively on the children who attended full-day kindergarten in the schools serving the neediest communities. In summary the main findings are:

1. From the analyses conducted it appears that generally children enter kindergarten without the ability to read (see table 29).

2. Regardless of program experience or SES, the vast majority of children are not able to read on their own even after finishing their kindergarten year.

3. As evidenced from the kindergarten pre-test results obtained with the Clay's Observation Survey sub-tests, children from more educationally advantaged homes do enter kindergarten with much more of the pre-requisite knowledge to enable them to become emergent readers. Low SES children entering kindergarten typically have much poorer skills than their middle and higher SES counterparts in the areas of letter identification, knowledge of words, writing, hearing and recording sounds in words, and their concepts about print (see table 29). Of these five skill areas tested, the higher SES students in cohorts 1 and 2 consistently outperformed the low SES students (see table 30).

4. Possessing the skills to become an emergent reader does not appear to be a differentiating factor of a child's actual reading ability (e.g., book reading) upon entry to kindergarten or upon leaving kindergarten. The literature suggests that developmental factors coupled with a knowledgeable grade-one teacher triggers the synthesis of these skills into what is known as the ability to read and understand what is read. In other words, prior to grade one, children are simply not developmentally ready to read. Chall (1983), a foremost reading specialist, describes children up to age six as being in the first of five stages of reading comprehension. At this first stage, children must master letter discrimination and learn the purpose of reading and writing; she argues that for this age group comprehension is better for oral language than it is for written language. It is not until grades two and three, the second stage of reading comprehension, that students develop their decoding skills and fluency to make meaning from text.

5. Given the present research findings (see table 30) evident at the end of the children's kindergarten year, it is clear that a full-day kindergarten experience enables children, particularly those from educationally deprived backgrounds (in this study this included students attending schools ranked between 1 and 17 in terms of school need), to acquire the skills needed to become emergent readers at least to the point at which they are at par with children from more educationally advantaged communities (in this study this included students attending schools ranked over 90 in terms of school need).

6. Table 30 shows clearly that by the end of the kindergarten year, the low SES full-day kindergarten children are achieving at par with their higher SES counterparts. Furthermore, the low SES full-day kindergarten children continue to achieve at par with the rest of the district on written literacy tests (e.g., HLAT reading and writing) administered at the end of grades one and two. All advantage in terms of reading and writing outcomes expected at the kindergarten level attributed to higher SES appear to have been eliminated by providing low SES children with full-day kindergarten opportunities.

7. Examining the kindergarten results in table 29 suggests that full-day kindergarten for middle SES children enables them to surpass their middle and higher SES peers in terms of emergent reading skills by the end of their kindergarten year.

8. Given the composition of the group served by full-day kindergarten in this study (two thirds of the schools were ranked as the neediest in the jurisdiction, one-third were randomly selected from the remainder of the schools in the jurisdiction) it is satisfying to observe that the proportions of students achieving grade level or higher on grade one HLAT reading and writing sub-tests were at least similar and in some cases greater than district results. Even more gratifying is the fact that by the end of grade one, children who attended full-day kindergarten in schools serving the neediest communities (those ranked between 1 and 17) in the district were performing as well, in terms of proportions of students achieving or exceeding grade level, on the grade one HLAT reading and writing sub-tests as children from throughout the entire Edmonton Public School district.

9. By the end of grade two the effects of full-day kindergarten (and undoubtedly other programs set into place in schools such as reading recovery, balanced literacy, small class size grade one, additional professional development for teachers in literacy, etc.) were still evident. Students who had experienced full-day kindergarten, including those who had attended full-day kindergarten in the schools serving the neediest communities, were still able to achieve grade level or higher on the grade two HLAT reading and writing sub-tests at rates similar to those experienced by the district as a whole (see table 30).

Table 29 Comparison of *all* full-day kindergarten program students with half-day program kindergarten students from kindergarten to grade two.

	Cohort 1			Cohort 2		
	Full-day	Half-day	Significantly Higher performing group	Full-day	Half-day	Significantly Higher performing group
Kindergarten pre-test observations						
Book reading level	0.18	0.34	Neither	0.45	0.32	Neither
Letter identification	17.92	28.85	Half-day	22.05	24.74	Half-day
Ready to read word test	0.39	1.05	Half-day	0.56	0.62	Neither
Writing	1.31	3.36	Half-day	1.97	2.41	Half-day
Hearing & recording sounds	1.42	5.04	Half-day	2.60	3.49	Half-day
Concepts about print	5.98	8.55	Half-day	6.78	7.58	Half-day
Kindergarten post-test observations						
Book reading level	1.65	1.81	Neither	1.92	1.71	Neither
Letter identification	46.15	44.68	Neither	46.07	44.59	Full-day
Ready to read word test	3.58	3.29	Neither	3.96	3.49	Full-day
Writing	12.57	10.53	Full-day	11.83	9.95	Full-day
Hearing & recording sounds	17.98	15.21	Full-day	17.09	12.87	Full-day
Concepts about print	13.92	13.09	Neither	14.27	12.64	Full-day
Grade 1 HLAT test (comparison group is entire district)						
Students writing at or above grade level	82.9%	73.9%	Full-day	85.0%	85.5%	Neither
Students reading at or above grade level	87.1%	85.9%	Neither	90.7%	86.6%	Neither
Grade 2 HLAT test (comparison group is entire district)						
Students writing at or above grade level	90.5%	90.7%	Neither			
Students reading at or above grade level	81.8%	86.0%	Neither			

Table 30 Comparison *of low SES (schools ranked 1 to 17 for district need)* full-day kindergarten program students with half-day program kindergarten students from kindergarten to grade two.

	Cohort 1			Cohort 2		
	Full-day, low SES	Half-day*	Significantly Higher performing group	Full-day, low SES	Half-day*	Significantly Higher performing group
Kindergarten pre-test observations						
Book reading level	0.13	0.20	Neither	0.32	0.21	Neither
Letter identification	16.36	30.50	Half-day	19.87	31.03	Half-day
Ready to read word test	0.33	1.25	Half-day	0.38	0.84	Half-day
Writing	1.13	3.71	Half-day	1.78	3.45	Half-day
Hearing & recording sounds	0.92	5.77	Half-day	2.07	5.18	Half-day
Concepts about print	6.33	8.42	Half-day	6.39	9.43	Half-day
Kindergarten post-test observations						
Book reading level	1.48	1.95	Neither	1.50	1.53	Neither
Letter identification	45.63	46.44	Neither	45.43	44.81	Neither
Ready to read word test	3.19	3.85	Neither	3.42	3.65	Neither
Writing	10.65	10.95	Neither	10.53	11.94	Neither
Hearing & recording sounds	16.09	15.95	Neither	16.16	14.89	Neither
Concepts about print	13.58	13.04	Neither	14.09	13.19	Neither
Grade 1 HLAT test (comparison group is entire district)						
Students writing at or above grade level	81.9%	73.9%	Full-day	84.2%	85.5%	Neither
Students reading at or above grade level	88.0%	85.9%	Neither	92.0%	86.6%	Full-day
Grade 2 HLAT test (comparison group is entire district)						
Students writing at or above grade level	90.0%	90.7%	Neither			
Students reading at or above grade level	82.4%	86.0%	Neither			

*Half-day kindergarten comparison group includes only those schools ranked over 90 on for need (middle to high SES), grade one and two comparisons include data from entire district.

Conclusions and Recommendations

Given the findings above a variety of conclusions and related recommendations present themselves.

1. The pre-test results obtained by the full-day kindergarten students suggest that more needs to be done for students of educationally disadvantaged families. Low SES students simply enter school in their kindergarten year too poorly prepared to learn the skills requisite to read. It is recommended that parenting centres closely linked to local elementary schools be established (as per the Alberta Learning Commission Report, 2004) to assist parents to better meet the academic and social needs of their children. It is also recommended that pre-kindergarten programming be offered to students aged 3.5 to 4.5 from high needs communities. This programming should be integrated with and prepare students for their kindergarten experience. It should draw on the six principles outlined by Corter and Park (1993) of exemplary kindergarten programs. More work also needs to be done to help the parents of young children living in educationally deprived communities to provide their children with a strong foundation of skills and knowledge at least comparable to that demonstrated by middle SES kindergarten children.

2. As one examines the student achievement trend from the phenomenal gains demonstrated by the end of the students' kindergarten year through to the end of grade two, for cohort 1, and grade one, for cohort 2, it appears that the effects of the full-day kindergarten experience may be diminishing with time. Full-day kindergarten is not, by itself, an inoculation ensuring students are able to continue to master reading and writing skills throughout their elementary experience. This is not surprising given that every year brings with it new challenges for students. Furthermore, it is of the utmost importance that supports, such as reading recovery, balanced literacy, and most importantly small class size, for children experiencing difficulty with literacy and numeracy be maintained and even expanded at the lower elementary level. Given the school effects literature it would be prudent to expand at least some of these sorts of supports into the upper elementary and even the high school levels. Students can only succeed if they feel they have the competence to master the curriculum they are presented. This sense of efficacy can only be developed through successive positive learning and social experiences in all grades; failure to provide these positive learning and social experiences at any given grade can only mean that a student is not ready to move on. This is not a problem that can be dealt with only at the district level; it must also be addressed on a provincial and even a national level.

3. Given the results in kindergarten, grade one, and grade two obtained by low SES students who attended full-day kindergarten programs, it is without a doubt that the program has positively affected their abilities to read and write in grades one and two. This comes in the face of a multitude of family and social issues (e.g., poverty, drug and alcohol abuse, physical abuse, high transience levels) all working to mitigate students' chances of success. Full day kindergarten needs to continue to be offered to low SES students.

4. Edmonton Public Schools has a unique opportunity to continue to follow the students who have experienced full-day kindergarten within its own boundaries. It is recommended that these students be followed at least through to the end of grade 6. Ideally, if resources permit, these students' accomplishments should be followed through to the end of high school.

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