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# Measuring the Impact of 21st Century Community Learning Centers

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11/27/2016

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This paper investigates the relationship between student achievement and participation in before- and after- school academic enrichment programs funded by the 21st Century Community Learning Center (21CCLC) grant. The 21CCLC program is aimed at students in high-poverty, low-performing schools. I analyzed the first two cohorts awarded the program in school years 2002/2003 and 2003/2004 and compared them to public schools not funded by the program. Using difference-in-differences estimation, I found schools receiving the program experienced a higher percentage of students meeting or exceeding test standards: 1.332% higher in the first year and 2.055% in the second year compared to schools without the intervention. Differentials were highest for middle schools with the outcome variable measuring 8.969% to 9.016% higher for schools with the intervention. My results give evidence to the efficacy of academic enrichment programs particularly those that target low-income students.

## *1. Introduction*

There is increasing recognition that time students spend outside the classroom is as important to a child's academic success as time spent inside the classroom. Education policy has focused with acceleration on policies that address this through before- and after-school programs to ensure a range of student's needs are met before they can excel academically. While it is hypothesized and heard anecdotally that these programs are beneficial, there is a need to evaluate their effectiveness and quantify the return on investment. Education policy that yields positive results has the potential to benefit all children in the United States, however, there is an argument that government funding of public schools is extensive, expensive, and should be redistributed to more productive areas of the economy.

The purpose of this research is to evaluate the effectiveness of before- and after- school academic enrichment programs in Illinois funded by the 21st Century Community Learning Center (21CCLC) program. The program began in Illinois in 2003 after being reinstated under No Child left Behind Act of 2002. It aims to support low income students at low performing public schools through before-and after- school activities. Program sites are encouraged to partner with social service organizations to expand their range of services and encourage parental involvement in the education process. The program is founded on the idea that if students receive support outside the classroom that meet a range of social, educational and physiological needs, they will be more engaged within the classroom. Engaged students should experience higher attendance and test scores which leads to on-time graduation.

This paper considers aggregate school level data from the Illinois State Board of Education (ISBE) for public schools awarded the grant in 2003 and 2004 and remaining schools that did not receive funding. The empirical analysis is carried out using Ordinary Least Squares (OLS) estimation and the Difference-in-Differences (DiD) technique to isolate the causal effect of the program. The paper applies this methodology to a number of academic outcomes at both school and grade levels and restricted samples to determine if the results hold and to highlight any additional insight.

Research evaluating the 21CCLC program in Illinois (Goodyear et al. 2016) is funded by ISBE and presents a static summary of program indicators collected from questionnaires. This paper seeks to apply economic analysis to the program in order to estimate robustly the relationship between program implementation and student test scores outcomes. James-Bardumy

et al. (2008) examined the impact of the program on behavioral outcomes using 21CCLC evaluation tools given to parents, teachers and students. In addition, Heers et al. (2014) examined the impact of Dutch community school subsidies, a model similar to the 21CCLC program, on student dropout and found the subsidies did not seem to have an effect. Unlike the literature above, this paper links the 21CCLC program with student test score performance outcomes rather than behavior or likelihood of dropout.

Results from the unrestricted sample show that the program led to a 1.322% increase in the number of students who met or exceeded test standards in the first year and 2.055% in the second year. Schools with a large low income student population experienced positive effects from the program; although the magnitude of the effect diminished as the low income student population grew. Analysis shows middle schools experienced the largest academic gains compared to schools who did not receive the intervention: an 8.969% increase in outcome variable in the first year and a 9.016% increase in the second year. Small gains were experienced by elementary schools ranging from 0.529% in the first year to 1.819% in the second year when contrasted with the comparison group. High schools with the intervention appeared to reduce their test score outcomes to the magnitude of 3.159% and 3.527% as a result of the program compared with like schools that did not receive the intervention. Overall, the percentage of students who met test standards on grade level outcomes more than doubled in some cases, although this was not reflected in the percentage of students who exceeded standards. Gains in Mathematics test scores far exceeded gains from Reading test scores in schools who implemented the 21CCLC program.

Consideration must be given to the policy implications of the 21CCLC program and student achievement. Evidence of strong relationship gives greater weight to the program and can be used to advocate for expanded funding, both public and private. Finally, it implies that there is potential to scale up the program, therefore providing more opportunities for low income students.

## *2. Literature Review*

Literature on educational interventions compares the level of certain educational outcomes before and after a policy has been implemented. Educational intervention evaluation can be placed in the econometric context of an education production function. The literature has

modelled these evaluations in several ways. Education production functions like those specified by Hanushek et al. (2005) follow a clear input-output model. Other evaluations expand on this method to incorporate additional estimation techniques like those of Oreopoulos et al. (2014) or through augmentations to the EPF like the research of Chingos (2012). Each specification captures the production of education as a cumulative process with many contributing factors.

The education production function (EPF) outlines educational inputs which contribute to one or more educational outcomes. The EPF captures factors that contribute to a student's schooling performance, including family characteristics, school resources and policy interventions. A value-added EPF can be used in order to isolate a causal relationship between inputs and output. The 'value-add' occurs when the lag of the dependent variable is added as an explanatory variable in order to focus on the growth in the output when other factors are held constant. The lag of the dependent variable effectively controls for all previous inputs, observable and unobservable, that contribute to output in the previous time period. Hanushek (2007) posits that a value-added EPF lessens the issues of omitted variable bias because the lagged output variable encompasses all previous inputs.

Many determining factors are considered to contribute to student achievement. The literature has considered expenditure-based inputs such as expenditure per pupil (Greenwald et al. 1996), or resource-based inputs like teacher characteristics (Rivkin et al. 2005) as determinants of student performance. Greenwald et al. collected previous EPF studies to re-analyze the effect of school resources on student achievement. They conclude that there is a systemic relationship 'large enough to be educationally important' (Greenwald et al. 1996). Rivkin et al. (2005) analyze the effectiveness of teacher quality on student performance and find that the two are systemically related, although the effects are small and most important for young students.

Policy interventions present themselves as shocks to the EPF causing a change in the level of educational inputs and outputs. These shocks can be expected or unexpected and determine student productivity, represented by a change in the educational outcome. Hogan and Rigobon (2003) incorporate unobserved supply shocks in the estimation of an EPF representing the returns to education across regions. They hypothesize that unobserved shocks to educational attainment cause heteroscedasticity of education across regions. Hogan and Rigobon (2003) add shocks to the EPF for each input variable: education, ability and individual characteristics. The

researchers then apply identification through heteroscedasticity (IH) to obtain parameter estimates, a relaxed instrumental variables method. The authors argue IH estimation does not require exact specification of the instruments used, however they acknowledge there are existing factors that cause education to be heteroskedastic which act as instruments. In conclusion, the authors find the estimation method provides returns to education which are not significantly different from returns estimated through OLS; however they are more precise than which is generated using instrumental variables techniques.

Additional estimation techniques have been applied to the EPF in order to obtain the effect of various educational interventions enacted through policy changes. Hanushek et al. (2005) applied difference-in-difference technique for the effect of teacher and school quality on student cognitive achievement using panel data from the Texas Schools Project. The change in student achievement is estimated as the difference between a student's test score conditional on family characteristics, teacher quality, school characteristics and innate ability. Holding time invariant factors fixed (family characteristics and innate ability), Hanushek et al. are able to isolate the effect of teacher and school quality on student academic achievement. They find that teacher quality is related to performance, although to a small degree. Similarly, the difference-in-difference method is adopted by Chingos (2012) in his evaluation of class size reduction policies in Florida. The study covers two levels of aggregation: two years of district-level implementation of the policy and three years of school-level implementation. On both accounts, the results indicate that the policy had a small, if any, effect on test scores. District-level analysis yielded no statistically significant results, while school-level analysis showed small negative effects on test scores but no positive effects at all. Oreopoulos et al. (2014) adopt difference-in-differences when analyzing an intervention geared towards at-risk youth in Toronto. The Pathways to Progress program provides free tutoring, mentoring, counselling and financial support to students residing exclusively in high crime, high poverty housing projects.

Other studies have examined educational interventions similar to the 21CCLC program. Heers et al. (2014) evaluated the effectiveness of community school subsidies on dropout prevention in high school pre-vocational education in the Netherlands. The community school subsidies were designed to increase academic support, parental engagement and community-school partnerships at government funded schools. Findings suggest that community schools had no effect significantly different from regular schools with regard to dropout prevention; although

Heers et al. note that this was not a goal of the community school subsidies to begin with. Results showed that community schools in the Netherlands served low-income, ethnically diverse population although this was not reflected in low performance of students, thus Heers et al. (2014) conclude there is no evidence of sample selection. To be sure, the researchers compare demographics of students entering community schools with those the same age that attend regular schools. They conclude there is no evidence of sample selection because community schools have a low income, ethnically diverse population and tend to outperform those who attend regular school.

Research on the 21CCLC program itself is limited. A study by James-Bardumy et al. (2008) analyzes the effect of the 21CCLC intervention on behavioral changes of participating students. They estimate the impact of the intervention on students' behavior through random selection of treatment and control groups for elementary students and self-selection for middle school students. At the elementary level, the program has high demand allowing for random selection, where at the middle school level the program was less demanded thus researchers used a comparison design rather than random assignment. The study found evidence of increased negative behavior. The authors cite increased time spent at school, friends influencing negative behavior and higher tolerance for negative behavior within the program as possible reasons for the results. Although test scores, grades and attendance records are collected in the study, no reference is made to the effect of the intervention on these outputs.

Similar to Heers et al. (2014), this paper applies difference-in-differences (DiD) to individual level data for an individual site evaluation to measure the change in educational outcomes. In addition, this paper expands the existing literature on the 21CCLC program which includes the study by James-Bardumy et al. (2008). However, this research examines test score performance rather than behavioral outcomes which serves as the second contribution. The literature inspires this research to examine a clear link between the quality of a student's experience and the level of educational outputs caused by the 21CCLC program.

### *2.1. The 21<sup>st</sup> Century Community Learning Center Initiative (21CCLC)*

The 21CCLC initiative is designed to help low income low performing students meet state education standards through participation in before or after school programs and summer learning activities (Afterschool Alliance 2009). Examples of before or after school programs

include; mentoring, tutoring, homework help classes, educational games, etc. The 21CCLC initiative was authorized in 2001 under the No Child Left Behind Act. It is a federally funded grant program administered by each state according to respective shares of Title I funds. Initial grants are given for a period of 5 years with the option of a three year extension. The first Illinois 21CCLC funded cohort began in 2003. In Illinois in 2014-2015 over 274 sites, down from the original 380 due to attrition, and 47,400 students were served by the 21CCLC grant (Goodyear et al. 2015).

Illinois State Board of Education administers the 21CCLC program and has seven statewide goals. These include; improved student performance, increased attendance and graduation rates, increased social emotional skills of students, collaboration within the community, coordination with schools to determine families with greatest need, development of program staff, and collaboration with schools and community-based organizations (Goodyear et al. 2015).

The program aims to achieve these goals through three main tenets. Firstly, academic enrichment focuses on improving student performance such as tutoring and homework help. Secondly, additional services to students are provided through community partnerships and cover services like health and dental checkups. Finally, parental engagement is encouraged through educational development for parents and families and additional social activities to bring them into the school environment.

### 3. *Theoretical Framework*

The education process is a series of choices based on maximizing utility. It is a choice between financing education and other consumption which is foregone with the purchase of education. The goal is to maximize a parent's utility by selecting a school with characteristics that best reflect parents' preference for affordability and quality of their child's education.

$$\max U = U(C, Q) \quad (1)$$

Where  $C$  is the consumption, and  $Q$  is the quality of the child. The goods  $C$  and  $Q$  can be analyzed individually using the budget constraint and EPF, respectively. Within the maximization function, consumption ( $C$ ) represents the budget constraint which details how education is purchased and takes the following form,

$$C + F = I(1 - t) + B \quad (2)$$



Where consumption in time  $t$  is  $C$  plus school fees ( $F$ ) which can be financed through gross income minus taxes  $t$  or through borrowing ( $B$ ). The budget constraint determines the parent' ability to consume. Parents will choose a school with the highest quality given their budget constraint thus achieving maximum utility.

The child's quality ( $Q$ ) in the maximization function is derived from the education production function (EPF) as;

$$Q_i = Q_i(X_j, P_i, S_j, V_j) \quad (3)$$

Where quality  $Q_i$  is a function of educational inputs;  $S_j$  are school characteristics for school  $j$ ,  $P_i$  are parental inputs,  $X_i$  are student characteristics and productivity shock is  $V_j$ . The EPF follows an input-output model where outcomes are a function of several inputs. The quality and quantity of these inputs determines the level of the educational outcome.

The 21CCLC tenets link to each of the EPF inputs in turn. The goal of increased test scores links directly with  $Q_i$  which manifests in overall quality of the child through test scores. The 21CCLC tenets of additional services and academic enrichment are linked with school characteristic input of the EPF. The degree of parental inputs will determine the child's socioeconomic status, among other observable characteristics, and should also drive the child's motivation to achieve if, for example, a parent volunteers at school or assists the child with homework. These inputs are linked with the parental engagement piece of the 21CCLC program. Finally, productivity shock  $V_j$  affects educational inputs so that a productivity development in student  $i$  or school  $j$  changes the level inputs, thus output  $Y_i$  is affected. Shock  $V_j$  represents educational event of the 21CCLC program. The 21CCLC program causes increases in productivity of students and schools such that output rises and quality improves.

The 21CCLC program enters the utility maximization function as an EPF shock to child's quality ( $Q$ ). The 21CCLC program manifests as a shock to the EPF which affects the quality of inputs that determine student outcomes. The 21CCLC shock enhances productivity in the three pillars of the program: additional services, parental engagement and academic enrichment. Assuming the shock caused by the program is positive; productivity will rise along with outcomes, thus improving the quality of a school and its overall attractiveness to parents. If the quality of education provided by the school fits within parents' budget constraint; then the parent's set of preferences is optimized thus maximum utility is achieved.

#### 4. Empirical Framework

Educational interventions create a shock to the level of inputs in the EPF. Function (3) is expanded to demonstrate a linear relationship between inputs, outputs and the educational shock. The value-added EPF is modelled to estimate the causal effect of the 21CCLC program on an individual student level;

$$Y_{it} = \beta S_{it} + \gamma P_{it} + \delta X_{it} + \varphi Y_{it-1} + \rho C_i + \omega T_{it} + \vartheta C_i T_{it} + V_{it} \quad (4)$$

Where  $Y_{it}$  reflects the educational outcomes for student  $i$ . The goals consist of; combined average of reading and math test scores ( $tsc_{it}$ ) for each school student, average daily school attendance ( $att_{it}$ ), and parental contact ( $pct_{it}$ ). The vector  $S_i$  includes school characteristics,  $P_{it}$  are parental inputs,  $X_{it}$  are student characteristics and productivity shock is  $V_{it}$ . Lagged variables of each outcome ( $Y_{it-1}$ ) are included to capture additional time varying unobserved inputs in the education process. The inclusion of  $Y_{it-1}$  avoids the issue of omitted variable bias and allows for the inputs between the time periods ( $S_i, X_{it}, T_{it}$ ) to be the focus of the analysis. The  $C_i$  is a dummy variable for the 21CCLC program; it is one if student  $i$  is affected by the 21CCLC intervention, otherwise  $C_i$  is zero. The interaction term  $C_i T_{it}$  represents students at a 21CCLC school during year  $T_{it}$ . The  $T_{it}$  is one for years after the intervention and zero for years before the intervention.

The coefficient of interest in (4) is  $\vartheta$  which represents the effect of the 21CCLC program on outcomes  $Y_i$  if a student attends a school with a 21CCLC program given the school year. This effect will be causal because it represents the difference in the change resulting from the 21CCLC intervention as demonstrated through difference-in-difference estimation. To this end, it is assumed  $S_{jt}$ ,  $P_{it}$ ,  $X_{it}$  and  $Y_{it-1}$  do not change in the observed time period, thus the change in outcome  $Y_{it}$  is attributable to whether a school has a 21CCLC program or not ( $\vartheta$ ).

The difference-in-difference (DiD) method will be applied to the above value-added EPF. The DiD technique is used frequently in policy evaluation to measure the change in outcomes by comparing the magnitude of the outcomes before and after a policy is implemented. Years 2001-2002 effectively serve as the control unit because the educational outcomes exist in unchanged states before the intervention is implemented. The resulting change experienced by the educational outcomes following the 21CCLC intervention (years 2003-2004) are then compared

to the time period before when the outcome remained unchanged. Any difference in the level of the outcome can then be attributed to the 21CCLC intervention. With time invariant characteristics held constant and time varying characteristics allowed to change, a causal relationship can be deduced between the change in educational outcome and the 21CCLC intervention from the time the program was implemented. DiD measuring the effect of the 21CCLC change in the value-added EPF is demonstrated as follows,

$$\vartheta = [y_{2003,2004,1} - y_{2001,2002,1}] - [y_{2003,2004,0} - y_{2001,2002,0}] \quad (5)$$

Where  $\vartheta$  is the observed difference in the outcome given a student attends a 21CCLC school ( $h = 1$ ) and the outcome given a student does not attend a 21CCLC school ( $h = 0$ ). Observed difference  $\vartheta$  represents the difference in each of the outcomes of interest (test scores, attendance and parental contact) in the years prior and years after 21CCLC was introduced at schools given that the value-added EPF inputs have been controlled for. The value of  $\vartheta$  holds the key to evaluating the intervention as it measures whether the educational outcomes improved as a result of the 21CCLC intervention.

##### 5. *Data and Descriptive Statistics*

Data is taken from the Illinois State Board of Education (ISBE), the government agency responsible for tracking and reporting public school data in Illinois. Data was collected for school years 2001/2002, 2002/2003 and 2003/2004 to cover a year before the 21CCLC intervention and two years after. The datasets have information on every public and charter school in the state, including numerous school- and district- level variables for input into the education production function. Data follows the school calendar beginning in fall through spring of the following year.

Schools in the first and second funded cohorts in years 2002/2003 and 2003/2004 were extracted from ISBE funding documents, and then coded with a 21CCLC binary dummy variable. The total 21CCLC schools in the first funded cohort was 128, however after attrition through school closures the number came to 117 schools. The second cohort added 42 more schools to the sample, however due to sample criteria the cohorts lose one school each from the sample. Of the 102 counties in Illinois, only 18 were funded in the first two cohorts suggesting a high concentration of poverty and low academic performance in these counties. Over 60% of

funded schools (167) are located in the City of Chicago School District 299. From the full three year population, the funded cohort sample yields 274 schools. Characteristics of the years analyzed are represented in Table (1).

Table 1: Year characteristics by intervention, funded cohort sample and full population.

	2001/2002	2002/2003	2003/2004
Presence of Intervention	0	X	X
Total Schools - Funded Cohort	0	116	158
Total Schools - Full Sample	3,786	3,794	3,771

*Note:* (1) Total observations in population number 11,741 schools and (2) Presence of Intervention refers to whether the 21CCLC grant was offered in the respective years, it is one if the intervention was available.

Across both funded cohorts, there are 224 elementary schools, 27 middle schools and 23 high schools. The 2002/2003 cohort focused primarily on elementary schools with over 80% of grant awards (97 schools) allocated to elementary schools. Grants awarded fell sharply for the second cohort and was more evenly distributed to middle and high schools. Funded schools by school level are shown in Table (2).

Table 2: Year characteristics by funded school type.

School Level	2001/2002	2002/2003	2003/2004
Elementary	0	97	127
Middle	0	13	14
High	0	6	17
Total - Full Population	0	116	158

In addition to school data, the county level unemployment rate was obtained from the US Bureau of Labor Statistics. The use of the unemployment rate was designed to act as a proxy for low income populations in order to further explain variation in outcome variable All Tests Meets/Exceeds as it relates to the 21CCLC program. The unemployment rate is reported as not seasonally adjusted and was transformed to obtain a yearly average that followed the same dates as the school calendar. Monthly averages were collected from July through June and averaged for each year to correspond to school data from ISBE.

County level juvenile justice admissions from the Illinois Department of Juvenile Justice (IDJJ) were added to the data as a control for factors that may have influenced All Tests

Meets/Exceeds. This variable represents violence prevalence among juveniles that may detract from students meeting or exceeding standards on state administered standardized tests. It is important to include a proxy for violence since 60% of funded 21CCLC schools are located in the City of Chicago school district where gang violence and gun crime is high. Juvenile justice admissions include new admissions to a juvenile justice facility ages 13-20 and are reported yearly by fiscal year through June 30. This data set was most appropriate of IDJJ data due to the frequency of reporting that matched exactly with ISBE data.

Table (3) presents summary statistics for demographics and school characteristics of the schools in the funded cohort, unfunded cohort and full population.

Table 3: Summary of school demographics and characteristics for years 2001/2002 -2003/2004.

Variable	Full Sample		Funded Cohort		Unfunded Cohort		Diff
	Mean	SD	Mean	SD	Mean	SD	
% White Students	67.439	35.262	12.950	21.431	66.124	35.978	***
% Black Students	17.901	30.225	52.761	38.979	18.742	30.930	***
% Hispanic Students	11.779	21.010	33.127	36.213	12.294	21.750	***
% Asian Students	2.731	5.460	0.931	3.421	2.688	5.426	***
% Native American Students	0.150	0.379	0.230	1.588	0.152	0.449	***
All Tests Meets/Exceeds	18.126	0.900	39.324	13.064	63.010	18.401	***
% Limited English Proficiency	4.756	10.584	12.104	17.533	4.933	10.862	***
% Low Income	36.027	29.914	81.868	16.821	37.134	30.488	***
Total Enrollment	337.347	2.000	611.858	361.324	470.964	338.654	***
% Attendance	94.633	2.354	92.939	3.299	94.592	2.395	***
% Mobility	11.778	-	28.678	13.575	16.716	11.973	***
Chronic Truancy	3.669	-	3.483	5.119	1.658	3.721	***
Total Expenditure	6.768	1.305	7.071	0.950	6.775	1.299	***
Property Taxes	300,536.400	33.643	404,516.800	429,642.700	139,595.800	307,112.100	***
Federal Funds Revenue	113,319.600	0.041	142,951.900	154,789.700	49,139.110	115,435.500	***
% Classes not taught by High Quality Staff	5.979	-	6.493	8.679	2.112	6.096	***
Average Teacher Experience	14.367	2.405	13.572	1.659	14.347	2.392	***
% Teachers with Bachelor's Degree	15.519	14.300	55.888	11.924	57.693	15.444	*

% Teachers with Master's Degree	42.171	15.514	43.966	11.914	42.215	15.439	*
Average Teacher Salary	4,845.358	13,740.440	28,995.770	4,373.571	26,524.580	4,849.936	***
% Parental Involvement	96.343	7.694	94.263	9.175	96.293	7.739	***
Unemployment Rate	6.302	1.064	6.987	0.705	6.318	1.062	***
Juvenile Justice Admissions	240.254	-	248.937	198.848	275.694	239.369	*
Total Observations	11,351		274		11,077		

*Note:* \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

Summary statistics are organized by student characteristics, school characteristics, district characteristics, teacher characteristics, parental characteristics and county-level specific characteristics. Student characteristics are demonstrated through the percentage of each race present at the school level, for example % White Students, % Black Students etc. Overall, the funded cohort is more ethnically and racially diverse than the unfunded cohort. On average, schools funded by the 21CCLC program have a majority of Black students (52.761%) and only 12.950% of White students. Compare this with the unfunded cohort which has a majority of White students (66.126%) and almost a third of the amount of Black students as a school with the 21CCLC program. Also, on average funded schools have 33.127% Hispanic students which contrasts with the 12.294% of Hispanic students present at unfunded schools.

School characteristics include those which demonstrate the quality of the school and education received by students. Outcome variable All Tests Meets/Exceeds is a composite measure of the fraction of students at a school that either meet or exceed state performance standards on all administered tests including the Illinois State Achievement Test (ISAT), the Prairie State Achievement Examination (PSAE), the Illinois Measure of Annual Growth in English (IMAGE) and the Illinois Alternate Assessment (IAA) tests. The funded cohort has a mean of 39.234% of students who meet or exceed standards on all tests, compared with 63.010% for the full sample.

Variable % Limited English Proficiency (LEP) describes the percentage of students at the school level that have a limited ability to speak and understand English. The funded cohort has the highest LEP of all three groups which corresponds to the increased diversity in these schools. Variable % Low Income is defined as the percentage of students who are eligible to receive free or reduced lunch, are living in substitute care or whose family receives state aid (Illinois State

Board of Education 2016A). The funded cohort has a mean of 81.868% for % Low Income students which is in line with the 21CCLC eligibility criteria for the grant. Grant guidelines stipulate that schools must have a minimum of 40% of students who qualify for free or reduced lunch in order to apply for the 21CCLC program. Total Enrollment for funded schools is much higher than unfunded schools and the entire sample. Finally, % Attendance and % Mobility define the percentage of students who attend school daily and the percentage of students who move in or out of the school within one school year, respectively. Students with lower attendance and greater mobility are at risk of low academic outcomes. These patterns of school characteristics indicate that lower quality schools are funded by the 21CCLC program.

District characteristics are all measured at the district level, transformed to real dollars and displayed in thousands. Total Expenditure is a composite measure of Operational Expenditure per Student and Instructional Expenditure per Student. Local Property Taxes is the amount of tax revenue collected locally that is allocated to school funding. Local property taxes are an important funding stream for Illinois school districts and provide, on average, 66.1% of total district funding (Illinois State Board of Education 2016B). Federal Funds Revenue describes district funding from the federal government and includes Title I monies. Title I is the specific federal funding stream allocated to high poverty schools to ensure students meets educational standards. This funding was increased with the signing of the No Child Left Behind Act of 2001 which tied this funding directly to teacher performance and academic outcomes. The inclusion of this variable attempts to control for the effect of the No Child Left Behind Act which corresponds in time with the introduction of the 21CCLC program in Illinois. Table (11) in Section 9 documents the mean of Federal Funds Revenue for the years analyzed, although no immediate increase is apparent directly after the passing the of No Child Left Behind Act.

In addition, the Act set forth that all school teachers must be ‘highly qualified’ (obtained an Associate’s degree or higher or passed examinations demonstrating knowledge) by school year 2005/2006 or else risk losing Title I funds. For this reason, variable % Classes Not Taught by Highly Qualified Staff measured at the school level is included as another control for the NCLB Act which may taint the effects of the 21CCLC program. Table (10) in Section 9 shows the average downward trend of % Classes Not Taught by Highly Qualified Staff for the years analyzed. Further teacher characteristics include Average Teacher Experience measured in years.

% Teachers with a Bachelor’s Degree and % Teachers with a Master’s Degree are measured at the district level.

The percentage of Parental Involvement at each school is the only variable included with relation to a parents’ engagement in a child’s education. It captures the amount of parents who communicate with teachers, be it over email or phone or through in-person parent-teacher meetings or PTO meetings. County specific characteristics include the Unemployment Rate and Juvenile Justice Admissions. Both variables are higher in counties with schools funded by the 21CCLC program.

The measured differences between the funded and unfunded cohort are statistically significant for all variables, with the exceptions of % Teachers with Bachelor’s Degree, % Teachers with Master’s Degree and Juvenile Justice Admissions which are all significant at the 10% level. The primary focus of this research is on outcome variable All Tests Meets Exceeds, although additional school level outcome variables are considered.

It is important to consider school level outcomes with respect to the effect of the 21CCLC program because the program was not allocated to elementary, middle and high schools in equal measure. In addition, school level outcomes may elucidate additional information that would otherwise be lost in composite measure All Tests Meets/Exceeds. Table (4) lists the percentage of students who meet or exceeds Reading and Math measures for grades 5, 8 and 11.

Table 4: Alternative outcome variables

Variable	Full Sample		Funded Cohort		Unfunded Cohort		Diff
	Mean	SD	Mean	SD	Mean	SD	
Grade 5 Reading Meets	36.694	10.604	26.912	9.920	37.013	10.474	***
Grade 5 Reading Exceeds	22.645	15.591	6.950	6.216	23.156	15.539	***
Grade 5 Math Meets	57.783	17.244	41.681	16.958	58.307	17.000	***
Grade 5 Math Exceeds	9.097	10.481	2.120	4.137	9.324	10.547	***
Grade 8 Reading Meets	55.873	12.444	41.730	9.951	56.393	12.219	***
Grade 8 Reading Exceeds	8.237	8.563	1.782	2.280	8.474	8.616	***
Grade 8 Math Meets	36.235	14.484	20.261	10.635	36.822	14.270	***
Grade 8 Math Exceeds	13.245	12.890	2.680	3.866	13.633	12.941	***
Grade 11 Reading Meets	45.013	11.836	27.009	13.370	45.233	11.649	***
Grade 11 Reading Exceeds	9.436	6.764	1.770	2.127	9.529	6.748	***
Grade 11 Math Meets	43.758	15.170	20.491	13.751	44.043	14.967	***



Grade 11 Math Exceeds	5.718	5.984	1.578	2.186	5.768	5.998	***
Observations	11,351		274		11,077		

*Note:* \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

The outcomes analyzed at each school level are Reading and Math, specifically the percentage of students who meet or exceed state standards in these subjects. Outcome All Tests Meets/Exceeds includes all other ISAT outcomes besides Reading and Math, however Reading and Math were chosen for grade level analysis because they are common to grades 5, 8 and 11 and were these tests administered in all the years analyzed. In the early 2000's, all grade 5, 8 and 11 students sat the standardized test for the Illinois State Achievement Test which measured students' performance on Reading and Math outcomes. These grade levels were chosen in order to cover all school levels at an age where students would reasonably be exposed to the 21CCLC program and have time to demonstrate its impact. Overall, schools funded by the 21CCLC intervention had very low percentages of students who exceeded Reading and Math Standards. In all cases the difference between the funded and unfunded cohorts are statistically significant at the 1% level. Finally, the magnitude of each coefficient of the funded cohort is lower than the unfunded cohort for every outcome variable. This points directly to the 21CCLC program's purpose to help low performing students meet educational outcomes.

## 6. Findings

The OLS method was used in combination with the DiD technique and clustered standard errors to estimate unknown parameters representing the impact of the 21CCLC program. Table (5) represents the DiD estimation results for four different samples. All regressions have covariates that follow DiD convention: a dummy variable for the 21CCLC program, n-1 binary regressors for each treatment year (2002/2003 and 2003/2004) and corresponding interaction terms for each of the binary regressors. The coefficients of interest are interaction terms 21CCLC\*2002/2003 and 21CCLC\*2003/2004. These terms represent the difference in academic outcomes between the years analyzed for schools with the 21CCLC intervention and schools without the program in the respective years. The baseline year is the year prior to the intervention (2001/2002) which is represented by the constant and interpreted as the average value of the outcome in the base year.

Table 5: Difference-in-difference estimation by full sample and school level.

All Tests Meets/Exceeds	(1) Full Sample		(2) Elementary		(3) Middle		(4) High	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
21CCLC program	-0.323	1.124	0.215	1.878	-7.696***	0.472	0.410	2.061
Year 2002/2003	1.362***	0.210	2.526***	0.264	-0.133	0.268	0.093	0.360
Year 2003/2004	2.025***	0.240	3.124***	0.319	1.567***	0.313	1.722***	0.386
21CCLC*2002/2003	1.332	1.181	0.529	1.964	8.696***	1.543	-3.159	2.676
21CCLC*2003/2004	2.055**	1.024	1.819	1.570	9.016***	1.501	-3.527	2.483
% Low Income	-0.127***	0.024	-0.180***	0.026	-0.139***	0.024	-0.197***	0.054
% Black Students	-0.526***	0.051	-0.380***	0.065	-0.391***	0.056	-0.752***	0.198
% Hispanic Students	-0.440***	0.037	-0.287***	0.038	-0.464***	0.062	-0.803***	0.175
% White Students	-0.283***	0.050	-0.127*	0.066	-0.162***	0.052	-0.471**	0.223
% Limited English Proficiency	-0.001	0.013	-0.023	0.022	-0.080**	0.036	-0.159	0.138
Total Enrollment	-0.010***	0.001	-0.005***	0.001	0.000	0.001	0.003**	0.001
% Mobility	-0.067**	0.023	-0.081***	0.025	-0.102***	0.022	-0.144**	0.057
% Chronic Truancy	-0.180***	0.023	-0.116***	0.036	-0.261***	0.065	-0.074**	0.030
Property Taxes	0.000**	0.000	0.000***	0.000	0.000	0.000	0.000***	0.000
Total Expenditure	-0.612***	0.197	-0.098	0.241	0.557**	0.246	0.091	0.288
Federal Funds Revenue	0.000	0.000	0.000**	0.000	0.000	0.000	0.000***	0.000
Average Teacher Salary	0.001***	0.000	0.001***	0.000	0.001***	0.000	0.000**	0.000
% Classes Not Taught by High Qualified Staff	-0.063***	0.021	-0.067**	0.027	-0.033*	0.017	-0.049*	0.026
% Teachers with Bachelor's Degree	0.116	0.202	-0.007	0.099	0.180	0.113	0.128	0.238
% Teachers with Master's Degree	0.200	0.203	0.014	0.103	0.231**	0.116	0.144	0.240
Average Teacher Experience	-0.524***	0.133	-0.109	0.158	-0.513***	0.126	-0.056	0.151
% Parental Involvement	0.100***	0.021	0.034	0.028	0.049	0.031	0.069***	0.019
Unemployment Rate	-0.506**	0.250	-0.461*	0.270	-0.584**	0.258	-1.286***	0.310
Juvenile Justice Admissions	-0.002***	0.001	-0.001	0.001	-0.002**	0.001	0.000	0.001
Constant	81.105***	21.230	82.501***	13.418	59.760***	13.036	90.954**	32.704
R2	0.701		0.805		0.797		0.793	
Observations	11,351		7,634		1,812		1,905	

Note: \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

Columns in Table (5) represent different samples in order to observe the impact of the program across school levels: (1) represents the full sample (11,351 schools), (2) includes only elementary schools (7,634 schools), (3) includes middle schools (1,812 schools) and (4) represents high schools (1,905 schools). The parameters of interest in each equation are those of the interaction terms between the 21CCLC dummy and the year binary regressors

(21CCLC\*2002/2003 and 21CCLC\*2003/2004). If, indeed, the 21CCLC program did increase tests scores over time then these parameters should have increased. In the full sample, the coefficients of interest are positive and economically significant. In the first year of program implementation, a school with the program has a 1.332% higher score on All Tests Meets/Exceeds than a school without the program in the same time period. For the second year of implementation, the coefficient of interest increases to 2.055% which is economically large and statistically significant at the 5% level. Interaction term 21CCLC\*2003/2004 includes schools who received the program in the 2002/2003 cohort and schools who received the program in the 2003/2004 cohort. The program's efficacy is evidenced in the increase in the effect of the program over time from a 1.332% to 2.055% increase in All Tests Meets/Exceeds. Schools awarded the 21CCLC program do not receive funding at the start of the school year which can push program implementation back to the second half of the year. This fact suggests that the coefficient of 1.332% may not be entirely capturing the effect of the program in the year 2002/2003, in fact, year 2003/2004 may be capturing, at least in some part, the effect of the first year of the program.

Disaggregation by school level yields helps to isolate program effects by school level and yields wildly different results across samples as demonstrated in Table (5). Elementary schools saw an increase of 0.529% in All Tests Meets/Exceeds if they implemented the program in the first year and an increase of 1.819% in All Tests Meets/Exceeds if they introduced the program in the second year. Middle schools experienced the largest gains from the 21CCLC program with an 8.696% increase in All Tests Meets/Exceeds in 2002/2003 and 9.016% increase in 2003/2004. These large gains are especially pronounced given only 27 out of the 274 funded sample were middle schools. While large and economically significant, these coefficients are also statistically significant at the 1% level. High schools who receive the intervention experienced a fall in outcomes by 3.159% in 2002/2003 and a further fall of 3.527% in 2003/2004. This may be due to the fact that students' taste for education and study habits are formed early in a student's academic career. These results suggest students may be less affected by educational interventions as they age. In addition, before and after school activities included in the 21CCLC program may take vital study time away from students resulting in a lower percentage of students who meet or exceed standards on all tests.

Signs of variables from Table (5) are as expected and are supportive of the extensive literature on school quality. For the overall sample, a one percent increase in low income students will result in a decrease of 0.127% in outcome measure All Tests Meets/Exceeds. This number is lowest for the high school sample and represents a decrease of -0.197% students who meet or exceed standards on all tests. In each sample, the percentage of low income students is statistically significant at the 1% level. Statistical significance is also present for the percentage of Black, Hispanic and White students, although to varying degrees. Overall, a one percentage increase in the Black student population causes the outcome measure 0.5% while a one percent increase in the Hispanic student population corresponds to 0.44% decrease. White students experience roughly half of that decrease (-0.283%). These results echo Fryer et al. (2015) who found that Whites and Hispanics were more receptive to experimental early education interventions than Blacks were. The authors tested the effect of incentives on parental involvement and cognitive achievement and found modest effects for White and Hispanic students, yet no effect at all for black students. A look at the effect of the percentage of Black, Hispanic and White students across school levels yields further nuanced information. The effect of a student's race/ethnicity on academic outcomes diverges as they age. In each case, the coefficients increase, meaning that race/ethnicity becomes more important to a student's school career as they progress from elementary school to middle school and middle school to high school. The effect of Black and Hispanic student's populations is statistically significant at the 1% level for all samples, however the effect of the White population is only significant at the 1% level for the full sample and for middle schools.

Total Enrollment has a negative, significant sign for the overall sample and elementary school sample, however this changes to a positive sign at the middle and high school levels. These signs indicate that elementary aged students benefit from smaller schools, however larger schools can have a small positive effect for older students. Mobility and Chronic Truancy percentages have negative signs on all counts. Mobility percentage increases across school levels and has a significant impact on All Tests Meets/Exceeds at the 1% level for all samples except for high school which is significant at the 5% level. Chronic Truancy percentage follows the same trend of significance. Further, teachers with a Master's degree have a greater impact on All Tests Meets/Exceeds than do teachers with a Bachelor's degree. Notably, Average Teacher Experience has a negative effect on the outcome measure across all samples sizes. The

coefficient is only significant for the full sample and middle schools sample. One possible reason for this unexpected result is that a teacher's level of education is more important than their experience in the classroom.

The sign on the 21CCLC dummy variable is also as expected due to the low quality of schools that are funded by the 21CCLC program, as demonstrated by the requirement of a minimum of 40% students who qualify for free or reduced price lunch. Considering the variable 21CCLC Program is a binary dummy, it demonstrates that, on average, schools who receive the intervention have much lower percentages of All Tests Meets/Exceeds than schools that do not have the intervention. Notably, middle schools with the intervention have 7.696% less students who meet or exceed all test standards, thereby demonstrating the significant disadvantage faced by middle school students before time is controlled for in the interaction term. Elementary and high schools have small positive coefficients for the 21CCLC dummy so schools funded by the intervention at these school levels have slightly higher percentages of students who meet or exceeds standards on all tests. Baseline averages for All Tests Meets/Exceeds in year 2001/2002 are represented by the constant of each sample.

The next stage of analysis restricts the full sample to schools with more than 40% low income population and schools with 50% low income population in Table (6). The samples are then compared to examine the effect of the intervention on low income schools (greater than 40% low income) as defined by the eligibility requirements for the 21CCLC program and high poverty schools (greater than 50% low income) as defined by the Illinois State Board of Education (2001). Tables (12) and (13) in the Section 9 examine the two sample sizes in isolation across school levels for all four sample sizes.

Table 6: Effect of 21CCLC program by Low Income and High Poverty Schools.

All Tests Meets/Exceeds	Low Income >40%		Low Income > 50%	
	Coef.	SE	Coef.	SE
21CCLC program	0.249	1.338	0.535	1.438
Year 2002/2003	3.930***	0.450	3.916***	0.640
Year 2003/2004	4.531***	0.568	4.088***	0.742
21CCLC*2002/2003	-0.1	1.611	-0.474	1.744
21CCLC*2003/2004	0.788	1.300	0.551	1.421
% Low Income	-0.102**	0.042	-0.081	0.052
% Black Students	-0.491***	0.047	-0.466***	0.043
% Hispanic Students	-0.394***	0.044	-0.363***	0.041
% White Students	-0.254***	0.051	-0.212***	0.049
% Limited English Proficiency	0.032**	0.014	0.034**	0.017
Total Enrollment	-0.010***	0.001	-0.010***	0.001
% Mobility	-0.092***	0.031	-0.096***	0.032
% Chronic Truancy	-0.179***	0.025	-0.191***	0.022
Property Taxes	0.000***	0.000	0.000***	0.000
Total Expenditure	-0.901**	0.400	-0.784*	0.477
Federal Funds Revenue	0.000***	0.000	0.000***	0.000
Average Teacher Salary	0.000**	0.000	0.001**	0.000
% Classes Not Taught by High Qualified Staff	-0.099***	0.018	-0.099***	0.017
% Teachers with Bachelor's Degree	0.146	0.606	-1.194	1.436
% Teachers with Master's Degree	0.166	0.601	-1.186	1.420
Average Teacher Experience	-0.035	0.206	-0.095	0.260
% Parental Involvement	0.055*	0.029	0.028	0.033
Unemployment Rate	-1.369***	0.485	-1.064*	0.648
Juvenile Justice Admissions	-0.001	0.001	-0.002	0.002
Constant	82.737	62.656	210.832	146.763
R2	0.663		0.627	
Observations	4,222		3,279	

Note: \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

Schools with more than 40% low income population who received the intervention in the first year have 0.100% less students who meet standards on tests. This percentage increases to 0.788% in the second year. This result generates evidence that the 21CCLC is gradually achieving its goal to assist low income students meet state test standards. Coefficients are somewhat smaller for high poverty schools who received the intervention. A school with the intervention and more than 50% low income population in 2002/2003 had 0.474% less on All Tests Meets/Exceeds than a comparable school, all else held constant. The second year of the

intervention yields a percentage of -0.551%. While the 21CCLC program is in fact improving outcomes for low income students, returns diminish as the percentage of low income students increases. Some reasons for this include the instability that poverty may bring to a student's life such as higher risk of moving schools and lower attendance as evidenced by increasing coefficients on % Mobility and % Chronic Truancy. In addition, high poverty schools may be more susceptible to anti-education peer sentiment. Overall, additional controls remain somewhat constant with the exception of variables % Teachers with a Bachelor's Degree and % Teachers with a Master's Degree. Coefficients for these two variables gain approximately one percentage point and change signs as the low income population increases from more than 40% to more than 50%. In addition, Average Teacher Experience decreases from -0.035 to -0.095 across samples. Combined, the negative teacher characteristics indicate that teacher quality struggles improve test scores at high poverty schools, thus student and environmental characteristics may be impacting students more when schools have a high poverty population.

Next, composite outcome All Tests Meets/Exceeds will be switched with school level outcomes to elucidate any additional information about which academic groups are impacted most by the intervention. Outcomes at the grade 5, 8 and 11 level are chosen to represent elementary, middle and high schools, respectively, and represent the frequency at which the ISAT test was administered. Table (7) disaggregates the data further to isolate grade 5 outcomes by the percentage of students who meet or exceed Reading standards and the percentage of students who meet or exceed Math standards. In this iteration of regressions, the coefficients of interest reveal more detail on the exact effect of the 21CCLC program. An elementary school with the 21CCLC program in year 2002/2003 has 2.387% less students who meet Reading standards. The following year, this number is almost halved to -1.396%. The percentage of students attending an elementary 21CCLC school who exceed Reading standards in 2002/2003 is 1.463%. This increases to 1.751% for students attending a 21CCLC school the following year. Both coefficients for Reading Exceeds are statistically significant at the 5% level. The percentage of students who meet Math standards and attend a 21CCLC school is 1.283% higher than students who do not attend a 21CCLC school. This number more than doubles the following year to 4.603% and gains statistical significance at the 5% level. The coefficients for Math Exceeds are 1.814 and 0.438 for years 2002/2003 and 2003/2004, respectively. These results indicate that the 21CCLC program has a large and significant effect on bringing low performing

students up to Reading and Math standards which is reflected in the doubling of Reading Meets and Math Meets outcomes. This results is consistent with the aims of the 21CCLC program to bring low income, low performing students up to state academic standards. Higher performing students do not experience the same gains. Reading Exceeds increases by a small margin while Math Exceeds regresses in small measure.

Table 7: Grade 5 outcomes by % Meets and % Exceeds.

Variable	Reading Meets		Reading Exceeds		Math Meets		Math Exceeds	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
21CCLC program	0.871	2.460	-2.394***	0.565	-1.079	2.892	-2.090**	0.917
Year 2002/2003	0.670**	0.342	1.369***	0.370	3.394***	0.441	2.148***	0.260
Year 2003/2004	-0.774	0.522	1.751***	0.394	4.265***	1.082	3.309***	0.471
21CCLC*2002/2003	-2.387	2.435	1.463**	0.726	1.283	2.678	1.814*	1.080
21CCLC*2003/2004	-1.396*	2.397	1.901**	0.821	4.603**	2.697	0.438	1.014
% Low Income	-0.048***	0.012	-0.211***	0.038	-0.145***	0.018	-0.097***	0.016
% Black Students	-0.162***	0.026	-0.219***	0.064	-0.285***	0.071	-0.183***	0.045
% Hispanic Students	-0.082***	0.023	-0.216***	0.046	-0.078	0.057	-0.196***	0.041
% White Students	-0.068***	0.025	-0.086**	0.077	-0.087	0.075	-0.126**	0.050
% Limited English Proficiency	-0.011	0.021	-0.018	0.040	-0.029	0.030	0.010	0.023
Total Enrollment	-0.002***	0.001	-0.002**	0.001	-0.006***	0.001	0.000	0.001
% Mobility	-0.049	0.030	-0.070***	0.016	-0.081**	0.036	-0.039***	0.009
% Chronic Truancy	-0.160***	0.045	-0.054	0.034	-0.118**	0.049	-0.024	0.024
Property Taxes	0.000	0.000	0.000	0.000	0.000**	0.000	0.000***	0.000
Total Expenditure	-0.734***	0.230	0.610**	0.292	-1.309***	0.382	1.002***	0.298
Federal Funds Revenue	0.000	0.000	0.000**	0.000	0.000***	0.000	0.000***	0.000
Average Teacher Salary	0.000	0.000	0.001***	0.000	0.000**	0.000	0.001***	0.000
% Classes Not Taught by High Qualified Staff	-0.152***	0.056	-0.031**	0.014	-0.176***	0.061	0.011	0.013
% Teachers with Bachelor's Degree	-0.475	0.342	0.476**	0.208	-0.986	0.688	0.557	0.417
% Teachers with Master's Degree	-0.533	0.342	0.519**	0.214	-1.066	0.692	0.597	0.417
% Parental Involvement	0.031	0.027	0.027	0.018	0.081**	0.042	0.023**	0.009
Average Teacher Experience	0.259**	0.100	-0.277	0.195	0.309**	0.161	-0.349***	0.125
Unemployment Rate	0.007	0.198	-1.001***	0.285	-0.593*	0.349	-0.580**	0.282
Juvenile Justice Admissions	0.000	0.001	0.000	0.001	0.001	0.001	-0.001	0.001
Constant	98.055**	34.505	-19.731	23.378	173.616**	71.881	-45.686	41.624
R2	0.468		0.692		0.680		0.537	
Observations	6,221		6,221		6,221		6,221	



Note: \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

Table (8) displays Grade 8 ISAT outcomes Reading and Math by the percentage of students who meet or exceed state standards. Similar patterns as those from grade 5 outcomes emerge for this middle school outcome.

Table 8: Grade 8 outcomes by % Meets and % Exceeds.

Variable	Reading Meet		Reading Exceeds		Math Meets		Math Exceeds	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
21CCLC program	-6.998***	0.615	-3.042***	0.387	-4.052***	0.718	-5.334***	0.509
Year 2002/2003	-3.018***	0.359	-0.481*	0.254	0.996***	0.360	0.849**	0.364
Year 2003/2004	0.315	0.363	-0.622**	0.267	0.598	0.403	1.928***	0.419
21CCLC*2002/2003	3.677*	2.045	3.716***	0.671	2.305	1.441	5.978***	0.983
21CCLC*2003/2004	7.351***	1.305	3.915***	0.968	5.310**	2.393	5.812***	1.188
% Low Income	-0.097***	0.020	-0.067***	0.013	-0.089***	0.020	-0.129***	0.021
% Black Students	-0.133***	0.045	-0.186***	0.072	-0.101*	0.056	-0.400***	0.104
% Hispanic Students	-0.170***	0.046	-0.278***	0.071	-0.032	0.055	-0.486***	0.104
% White Students	-0.032	0.045	-0.141**	0.069	0.066	0.055	-0.307***	0.101
% Limited English Proficiency	-0.080*	0.045	0.014	0.025	-0.079*	0.043	0.007	0.044
Total Enrollment	0.000	0.001	0.001	0.001	-0.001	0.001	-0.001	0.001
% Mobility	-0.045**	0.022	-0.079***	0.017	-0.103***	0.024	-0.037	0.022
% Chronic Truancy	-0.385***	0.072	-0.060*	0.036	-0.287***	0.074	-0.074	0.051
Property Taxes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Expenditure	-0.164	0.238	0.603***	0.233	-0.727***	0.281	0.958***	0.322
Federal Funds Revenue	0.000**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Average Teacher Salary	0.000	0.000	0.000***	0.000	0.000***	0.000	0.001***	0.000
% Classes Not Taught by High Qualified Staff	-0.004	0.032	0.002	0.015	-0.046**	0.022	-0.048***	0.015
% Teachers with Bachelor's Degree	0.413**	0.191	-0.321***	0.099	-0.387***	0.159	0.221***	0.084
% Teachers with Master's Degree	0.408**	0.191	-0.289***	0.100	-0.427***	0.158	0.306***	0.088
% Parental Involvement	0.058*	0.032	-0.021	0.027	0.052	0.037	0.028	0.025
Average Teacher Experience	-0.142	0.111	-0.437***	0.110	-0.062	0.122	-0.474***	0.153
Unemployment Rate	-0.062	0.189	-0.240	0.174	-0.332	0.221	-0.577**	0.297
Juvenile Justice Admissions	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001
Constant	22.548	20.499	54.671***	12.761	76.296***	17.803	11.411	13.66
R2	0.673		0.555		0.638		0.609	9
Observations	1,806		1,806		1,806		1,806	

*Note:* \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

The percentage of students who meet Reading standards at a 21CCLC school is 3.677% higher than students who attend a school without the intervention. This percentage jumps to 7.351% in the second year and gains statistical significance at the 1% level. Outcome Reading Exceeds shows a significant yet marginal increase from 3.716 in 2002/2003 to 3.915 in 2003/2004. Math outcomes follow the same patterns with large increases in the Meets category and relatively constant Exceeds category. The percentage of students who meet Math standards and attend a 21CCLC school is 2.305% higher than a student who does not. This coefficient more than doubles in the second year of implementation to 5.310% and gains significance at the 5% level. The outcome Math Exceeds remains constant with coefficients of 5.978 and 5.812, respectively. Both coefficients for Math Exceeds are statistically significant at the 1% level. Grade 8 outcomes on Reading and Math support earlier findings on grade 5 outcomes to show that students who are just below state standards have the most to gain from the 21CCLC program as it enables them to meet standards after exposure to the intervention. There is little evidence to suggest students who met standards before the intervention have been moved up to exceed standards since exposure to the intervention.

Finally, Table (9) analyses the effect of school, student, parent and county characteristics on Grade 11 ISAT outcomes Reading and Math. Outcome Reading Meets is 7.746% lower for students who attend a school with the 21CCLC program in 2002/2003 and this coefficient falls further to -10.825% the following year, although maintains statistical significance at the 1% level. For outcome Reading Exceeds both coefficients are positive and significant at the 10% level while also being economically significant in magnitude. The interaction term for a high school with the intervention in 2002/2003 is 1.798 which increases to 2.345 in 2003/2004. Math Meets shows a large improvement from first to second year implementation of the 21CCLC program. The coefficient of the interaction term in the first year is -8.517 and the following year is -3.445. Math Exceeds shows a decrease across years with coefficients of interest numbered at 2.623 and -0.564, respectively.

Table 9: Grade 11 outcomes by % meets and % exceeds.

Variable	Reading Meet		Reading Exceeds		Math Meets		Math Exceeds	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
21CCLC program	1.016	1.595	-1.182	0.997	1.152	2.575	-0.919*	0.553
Year 2002/2003	-0.246	0.430	-1.165***	0.232	1.130***	0.437	-1.234***	0.157
Year 2003/2004	2.140***	0.417	-2.298***	0.279	-1.369***	0.511	1.932***	0.302
21CCLC*2002/2003	-7.746***	2.045	1.798*	1.084	-8.517***	3.222	2.623**	1.088
21CCLC*2003/2004	-10.825***	3.943	2.345*	1.361	-3.445	2.805	-0.564	0.935
% Low Income	-0.159***	0.032	-0.040	0.032	-0.197***	0.042	-0.039**	0.020
% Black Students	-0.285***	0.065	-0.385***	0.141	-0.594***	0.160	-0.344***	0.075
% Hispanic Students	-0.268***	0.059	-0.426***	0.129	-0.518***	0.147	-0.387***	0.078
% White Students	-0.171**	0.084	-0.301**	0.152	-0.380**	0.181	-0.279***	0.081
% Limited English Proficiency	-0.156	0.102	-0.081	0.077	-0.125	0.146	-0.033	0.047
Total Enrollment	0.001	0.001	0.002**	0.001	0.000	0.001	0.002***	0.001
% Mobility	-0.174*	0.097	-0.067***	0.021	-0.175***	0.063	-0.010	0.023
% Chronic Truancy	-0.113**	0.049	-0.014	0.019	-0.104***	0.031	-0.012	0.016
Property Taxes	0.000**	0.000	0.000***	0.000	0.000***	0.000	0.000***	0.000
Total Expenditure	-0.098	0.204	0.150	0.215	-0.404	0.268	0.440**	0.183
Federal Funds Revenue	0.000	0.000	0.000***	0.000	0.000***	0.000	0.000***	0.000
Average Teacher Salary	0.000	0.000	0.000**	0.000	0.000	0.000	0.000***	0.000
% Classes Not Taught by High Qualified Staff	-0.098***	0.031	0.035	0.026	-0.061**	0.024	-0.034**	0.015
% Teachers with Bachelor's Degree	0.181	0.176	0.035	0.129	0.262	0.263	-0.236**	0.120
% Teachers with Master's Degree	0.206	0.177	0.043	0.131	0.292	0.265	-0.232**	0.123
% Parental Involvement	0.025	0.023	0.030***	0.010	0.058***	0.019	0.010	0.009
Average Teacher Experience	0.157	0.133	-0.050	0.073	0.166	0.132	-0.039	0.066
Unemployment Rate	-0.127	0.271	-0.737***	0.160	-1.127***	0.269	-0.736***	0.173
Juvenile Justice Admissions	0.000	0.001	0.001**	0.001	0.000	0.001	0.001**	0.000
Constant	49.638**	19.682	36.331*	21.136	63.434*	33.289	53.739***	14.725
R2	0.714		0.576		0.786		0.602	
Observations	1,903		1,903		1,903		1,903	

Note: \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

Grade 11 outcomes most affected by the 21CCLC program appear to be Reading Exceeds and Math Meets. The impact on Reading Exceeds is especially pronounced since the baseline average for the percentage of students who exceed Reading standards in 2001/2002 is 36.331%, the lowest baseline score for all four outcomes and over 10% lower than Reading Meets. This points to more advanced students improving reading skills since being exposed to the

intervention. In addition, the increase of 5% in the percentage of students who meet Math standards is very economically significant and can have lasting effects on a student's post-secondary success.

### *7. Conclusion*

The 21st Century Community Learning Center program targets low income students at low performing schools in order to bring them up to proficient levels on standardized tests. The program aims to support students in three main ways: improving academic outcomes, engaging social service agencies at the school level to provide additional resources to students and parents, and engage parents in the academic careers of their children. To test the efficacy of the program, this research analyzed the first two cohorts that were funded in 2002/2003 and 2003/2004 which consisted of 274 schools, located mostly in the City of Chicago school district.

Regression analysis followed the convention of the education production function, including as many available, relevant variables as possible that may contribute to a student's success in school. Interaction terms were added in order to obtain the difference between outcomes for a school receiving the intervention in the time period analyzed with a school not receiving the intervention during the same time period. The results were clustered at the district level to eliminate heterogeneity that may emerge due to differences in district size, funding etc. A number of academic outcomes were tested in order to ensure robustness of results across school levels and grades.

Schools receiving the program in the first two cohorts experienced an increase of 1.332% in students meeting or exceeding standards on all tests in the first year of program implementation. The following year, the effect of the program increased to 2.055%. Middle schools who, despite totaling only 24 of the 274 schools funded, experienced the largest gains. A treated middle school had an 8.969% increase in students meeting and exceeding standards in the first year and 9.016% of students meeting and exceeding standards in the second year. The next result of distinction is the fact that academic gains diminished as the percentage of low income students increased, thus underscoring the effects of poverty on a child's education.

Additional outcomes for Math and Reading were examined at the grade 5, grade 8 and grade 11 levels. The percentage of students who met standards was impacted more by the

intervention than the percentage of students who exceeded standards. This result reflects the focus of the 21CCLC program and, in fact, the No Child Left Behind Act that made low performing students the target of education policy. In some cases the percentage of students who met test standards doubled from the first year to the second year of the intervention. Additionally, the percentage of students meeting or exceeding Math standards increased in magnitude more than the Reading outcomes. This is important as Math outcomes have been shown by the literature to be strong predictors of future academic and career success.

These findings are significant and translate to a greater portion of low income, low performing students becoming proficient in standardized tests. These results can translate to even larger lifetime gains through increased education and lifetime earnings. They also give evidence to the effectiveness of the 21CCLC intervention at targeting this population. However, there are sub-populations that are still out of reach of the program. High performing students and high poverty students are less, if at all, affected by the additional supports provided by the program. Although this is not solely the responsibility of the program or indicative of its failings, it illuminates a population that is still being left behind by education policy. Overall, the 21CCLC program appears to be on track to achieve its aims in Illinois in the first two years of implementation. There is a strong relationship between the program and improvements in academic outcomes that makes government provision of the program a worthwhile investment.

Additional research would benefit from additional years added to the dataset in order to examine the effects of the program over time. Later years would give some indication of the lasting effects of the No Child Left Behind Act and time trends for the impact of the 21CCLC program in any given year. It would also allow for a rural versus urban analysis as the 21CCLC program spread across Illinois after the first several cohorts were concentrated in the City of Chicago. Further, individual level data would improve this analysis immensely for the additional detail it would provide on specific populations impacted by the program.

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9. Tables

Table 10: Average trend of % Classes Not Taught by High Quality Staff.

% Classes Not Taught by High Quality Staff	Mean	SD	Minimum	Maximum
2001/2002	2.465	6.801	0	100
2002/2003	1.945	5.539	0	100
2003/2004	1.925	5.865	0	100

Notes: The No Child Left Behind Act enforced schools nationally to have all staff certified as ‘high quality’ by 2006. High quality was defined as having a teaching degree or passing class specific tests demonstrating expertise.

Table 11: Average trend of Federal Funds Rate (thousands).

Federal Funds Revenue	Mean	SD	Minimum	Maximum
2001/2002	52,532.640	124,426.200	0.400	353,948.100
2002/2003	45,527.690	106,677.200	0.041	303,141.900
2003/2004	49,365.510	114,454.300	0.414	323,598.600

Notes: The No Child Left Behind Act increased federal funding for low-income schools, known as Title I funding.



Table 12: School level analysis by Low Income students > 40%.

All Tests Meets/Exceeds	Full Sample		Elementary		Middle		High	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
21CCLC program	0.249	1.338	0.124	1.867	-9.294***	0.915	2.079	2.569
Year 2002/2003	3.930***	0.450	4.664***	0.522	0.761	0.627	-2.358*	1.363
Year 2003/2004	4.531***	0.568	5.238***	0.694	1.641**	0.814	1.341	1.151
21CCLC*2002/2003	-0.100	1.611	0.014	2.195	8.025***	1.988	-3.697	2.854
21CCLC*2003/2004	0.788	1.300	1.153	1.760	8.708***	1.734	-4.733*	2.859
% Low Income	-0.102**	0.042	-0.153***	0.043	-0.049	0.036	-0.102	0.080
% Black Students	-0.491***	0.047	-0.464***	0.049	-0.219	0.286	0.669***	0.220
% Hispanic Students	-0.394***	0.044	-0.355***	0.041	-0.241	0.286	0.638***	0.179
% White Students	-0.254***	0.051	-0.226***	0.053	0.005	0.286	-0.361	0.242
% Limited English Proficiency	0.032**	0.014	-0.011	0.026	-0.059	0.048	-0.408	0.352
Total Enrollment	-0.010***	0.001	-0.005***	0.001	0.000	0.002	0.002	0.001
% Mobility	-0.092***	0.031	-0.096***	0.029	-0.105***	0.032	0.205***	0.033
% Chronic Truancy	-0.179***	0.025	-0.128***	0.035	-0.258***	0.070	-0.028	0.023
Property Taxes	0.000***	0.000	0.000***	0.000	0.000***	0.000	0.000***	0.000
Total Expenditure	-0.901**	0.400	-0.372	0.534	0.837*	0.506	0.804	1.038
Federal Funds Revenue	0.000***	0.000	0.000***	0.000	0.000	0.000	0.000***	0.000
Average Teacher Salary	0.000**	0.000	0.001**	0.000	0.001**	0.000	-0.001**	0.000
% Classes Not Taught by High Qualified Staff	-0.099***	0.018	-0.091***	0.021	-0.105***	0.034	-0.058**	0.025
% Teachers with Bachelor's Degree	0.146	0.606	-0.150	0.573	-0.040	1.236	2.395*	1.403
% Teachers with Master's Degree	0.166	0.601	-0.207	0.571	0.019	1.234	2.685*	1.405
Average Teacher Experience	-0.035	0.206	0.175	0.206	-0.593**	0.250	-0.449	0.438
% Parental Involvement	0.055*	0.029	0.014	0.030	0.066	0.050	0.049*	0.029
Unemployment Rate	-1.369***	0.485	-1.243**	0.561	-0.450	0.449	0.485	0.791
Juvenile Justice Admissions	-0.001	0.001	-0.001	0.001	-0.001	0.001	0.001	0.003
Constant	82.737	62.656	110.170**	59.853	56.106	135.518	-143.254	135.221
R2	0.663		0.715		0.730		0.683	
Observations	4,222		3,431		428		363	

Note: \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.

Table 13: School level analysis by Low Income students >50% (High Poverty schools).

All Tests Meets/Exceeds	Full Sample		Elementary		Middle		High	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
21CCLC program	0.535	1.438	0.264	1.914	10.523***	1.296	3.615	2.837
Year 2002/2003	3.916***	0.640	4.681***	0.708	0.358	0.851	-4.040**	1.632
Year 2003/2004	4.088***	0.742	4.938***	0.891	0.582	0.976	-0.269	1.250
21CCLC*2002/2003	-0.474	1.744	-0.309	2.301	10.595***	2.203	-4.720	3.219
21CCLC*2003/2004	0.551	1.421	1.017	1.789	10.736***	2.098	-5.312*	3.102
% Low Income	-0.081	0.052	-0.137**	0.056	-0.005	0.036	-0.065	0.057
% Black Students	-0.466***	0.043	-0.441***	0.043	-0.083	0.403	-0.755***	0.205
% Hispanic Students	-0.363***	0.041	-0.329***	0.037	-0.095	0.404	-0.705***	0.156
% White Students	-0.212***	0.049	-0.194***	0.050	0.155	0.416	-0.426**	0.206
% Limited English Proficiency	0.034**	0.017	-0.010	0.028	-0.082*	0.048	-0.416	0.422
Total Enrollment	-0.010***	0.001	-0.005**	0.002	-0.001	0.003	0.001	0.001
% Mobility	-0.096***	0.032	-0.102***	0.029	-0.097***	0.038	-0.158***	0.028
% Chronic Truancy	-0.191***	0.022	-0.146***	0.032	-0.332***	0.066	-0.019	0.019
Property Taxes	0.000***	0.000	0.000***	0.000	0.000**	0.000	0.000***	0.000
Total Expenditure	-0.784*	0.477	-0.071	0.649	0.738	0.591	-0.073	0.982
Federal Funds Revenue	0.000***	0.000	0.000***	0.000	0.000	0.000	0.000***	0.000
Average Teacher Salary	0.001**	0.000	0.001**	0.000	0.001**	0.000	0.000	0.000
% Classes Not Taught by High Qualified Staff	-0.099***	0.017	-0.093***	0.021	-0.116***	0.043	-0.022	0.019
% Teachers with Bachelor's Degree	-1.194	1.436	-0.673	1.656	-3.228	2.136	7.827**	3.766
% Teachers with Master's Degree	-1.186	1.420	-0.755	1.636	-3.138	2.147	8.114**	3.783
Average Teacher Experience	-0.095	0.260	0.127	0.250	-1.042***	0.291	-0.587	0.588
% Parental Involvement	0.028	0.033	0.003	0.032	0.012	0.062	0.015	0.032
Unemployment Rate	-1.064*	0.648	-1.196*	0.725	0.145	0.605	1.398	0.994
Juvenile Justice Admissions	-0.002	0.002	-0.002	0.002	-0.002	0.002	0.001	0.004
Constant	210.832	146.763	156.237	169.418	361.234	226.041	-681.321**	370.744
R2	0.627		0.671		0.593		0.593	
Observations	3,279		2,739		285		285	

Note: \* Statistically significant at the 10% level, \*\* statistically significant at the 5% level, \*\*\* statistically significant at the 1% level.