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ABSTRACT

This study sought to determine the degree to which school and community factors influence mathematics and science achievement of public school students in Georgia. Of particular concern was identifying variables to assist educators, parents, and other child advocates in providing academic programs that are responsive to the needs of learners. Data were taken from the 1996-1997 academic year using school districts in Georgia's 159 counties. Thirty of the 40 correlations were statistically significant and documented that lower academic performance in science and mathematics is related to high unemployment, high infant mortality, high enrollment in remedial classes, high drop out rates, low income, low number of adults with high school diplomas, and low enrollment in gifted classes. The analysis verifies strong relationships between school performance and specific community and school characteristics. (Author/SOE)

COMMUNITY AND INSTITUTIONAL CORRELATES OF ACADEMIC ACHIEVEMENT IN GEORGIA SCHOOLS

by
Olivia M. Boggs

OVERVIEW

Since to the 1957 wake-up call of the Sputnik launch, scores of educational reforms have targeted the low performance of American children in science and mathematics. Over the last 30 years more than a thousand state and national school reform laws have been enacted (Bandlow, 2001). Major organizations such as the National Council of Teachers of Mathematics, the American Association for the Advancement of Science, and the National Academy of Sciences developed measures to assist schools and teachers. Individual states responded by strengthening academic standards, upgrading core curricula, and tightening exit criteria. A full-out assault on academic mediocrity and a commitment to excellence have been waged on all fronts.

To the disappointment of many, expected improvements have not been forthcoming. The March 1998 report of the Third International Mathematics and Science Study (TIMSS) revealed that American children continue to perform at low academic levels when compared with other "developed" countries (NCES, 2000). Considered to be the largest international assessment of students in history, the TIMSS results placed the United States at or near the bottom in the critical areas of advanced science and mathematics. These results were mirrored by the more recent findings of the National Assessment of Educational Progress (NAEP) which reported small gains in lower grades and a decline

among 12th graders between 1996 and 2000 in mathematics and science achievement (NAEP, 2001).

While most school reform legislation places the job of improvement squarely on the shoulders of schools, teachers, and classrooms, it has become increasingly clear that factors that influence the academic achievement of a child are present throughout the community. The popular notion of "taking a village to raise a child" recognizes the importance of creating paradigms that embrace a holistic approach to education and identify a myriad of factors that influence children and their academic performance.

PURPOSE

This study sought to determine the degree to which school and community factors influence mathematics and science achievement of public school students in Georgia. Of particular concern was identifying variables to assist educators, parents, and other child advocates in providing academic programs that will be responsive to the needs of learners.

METHODOLOGY

Data were taken from the 1996-1997 academic year, using school districts in Georgia's 159 counties. Because the county served as the unit of analysis, the State's 21 city school districts were not included. Correlation and regression analyses were performed to determine the paired relationships and weighted influences of the variables. The following data elements were collected:

School Data

1. ITBS (Math): Average scores on the Iowa Test of Basic Skills in 5th grade mathematics
2. HGST (Math): % of students passing the high school graduation test in mathematics
3. HSGT (Science) % of students passing the high school graduation test in science
4. SAT: Average combined score on the Scholastic Achievement Test
5. Family Income: % of students eligible for free and reduced lunch
6. Status: % of students enrolled in gifted, remedial and special education classes
7. Dropout rate: Average high school dropout rate
8. Absenteeism: Average number of students absent for 10 or more days.

Community Data

1. Unemployment: County unemployment rate
2. School Completion: % of residents aged 25 and older who have completed high school
3. Delinquency: County Juvenile arrest rate

FINDINGS

Thirty of the 40 correlations (table 1) were statistically significant and documented that lower academic performance in science and mathematics is related to high unemployment, high infant mortality, high enrollment in remedial classes, high dropout rates, low income (eligibility for free lunch), low number of adults with high school diplomas, and low enrollment in gifted classes. Absentee rates were related to achievement in two of the four areas.

Correlations of Academic Achievement with School & Community Variables

	HSGT Math	Gr5 ITBS Math	SAT Total	HSGT Science
Unemployment Rate	-.40636*	-.38627*	-.49826*	-.43672*
	p < 0.000	p < 0.000	p < 0.000	p < 0.000
Adult HS Grads	-0.02	0.01	0	-0.08
	p <769	p<863	P < 0.974	p < 0.294
Juvenile Arrest Rate	.40076*	.48349*	.51306*	.44791*
	p <0.000	p<0.000	p < 0.000	p < 0.000
Eligibility for Free Lunch	-.73608*	-.63600*	-.67700*	-.79591*
	p < 0.000	p < 0.000	p < 0.000	p < .00
Infant Mortality	-.33955*	-.32838*	-.39476*	-.40735*
	p < 0.000	p < 0.000	p < 0.000	p < 0.000
Gifted Enrollment	.25108*	.33564*	.40801*	.31273*
	p < .001	p < 0.000	p < 0.000	p < 0.000
Remedial Enrollment	-.35112*	-.34774*	-.29638*	-.32429*
	P < 0.000	p < 0.000	p < 0.000	p < 0.000
HS Dropout Rate	-.15151*	-.38095*	-.27983*	-.37163*
	p < 0.047	p < 0.000	p < 0.000	p < 0.000
Special Ed. Enrollment	0.0597	0.05191	0.05954	0.02852
	p < 0.435	p< 0.498	p < 0.437	p < 0.709
School Absenteeism	.23041*	0.11612	.16449*	0.12912
	p < 0.002	p < 0.128	p < 0.031	P < 0.090

*significant at p < .05

Tables 1 through 4 present the results of regression analyses using the following ten independent variables: (1) eligibility for free or reduced lunch, (2) unemployment rate, (3) gifted enrollment, (4) remedial enrollment, (5) dropout rate, (6) special education enrollment, (7) % county residents who completed high school, (8) county juvenile arrest rate, (9) student absentee rate, and (10) county infant mortality rate.

1. Performance on the HGST (Math)

The first regression analysis indicated that five of the ten independent variables were predictive of passing the high school graduation test in mathematics on the first attempt. They are listed in Table 1 in order of significance with beta coefficients indicating the weight and direction of the influence.

Table 1: Stepwise Regression Analysis with HSGT (Math) as the Dependent Variable

VARIABLE	BETA	St. Err. of BETA	B	St. Err. of B	t (113)	p-level
Free Lunch	-.767933	.0818062	-.404011	.0430384	-9.38723	.0000000
Absenteeism	.110976	.0633669	.001316	.0007517	1.75133	.0826033
Dropout Rate	.118990	.0644909	.378315	.2050413	1.84507	.0676463
Remedial Enroll.	-.106487	.0671691	-.144146	.0909233	-1.58535	.1156806
Unemployment	.099774	.0726164	.004233	.0030811	1.37398	.1721656

2. Performance on the HSGT (Science)

A second regression analysis using HGST-science as the dependent variable with the same ten independent variables resulted in five being predictive as indicated in Table 2.

Table2: Stepwise Regression Analysis with HSGT (Science) as the Dependent Variable

VARIABLE	BETA	St. Err. of BETA	B	St. Err. of B	t (113)	p-level
Free Lunch	-.916253	.0744510	-.647609	.0526221	-12.3068	.0000000
Unemployment	.093492	.0675104	.005329	.0038483	1.3849	.1688244
HS Grads	-.116018	.0728618	-.157259	.0987615	-1.5923	.1141096
Sp. Education	-.084471	.0571475	-.395350	.2674679	-1.4781	.1421579
Infant Mortality	-.070033	.0561944	-.001192	.0009565	-1.2463	.2152464

3. Performance on the 5th grade ITBS (Math)

Using the same ten independent variables, a third regression analysis reported the seven factors listed in Table 3 as predictive of performance on the fifth grade ITBS in mathematics.

Table 3: Stepwise Regression Analysis with 5th Grade ITBS (Math) as the Dependent Variable

VARIABLE	BETA	St. Err. of BETA	B	St. Err. of B	t (114)	p-level
Free Lunch	-.420229	.1019122	-.240671	.0583665	-4.12345	.0000723
Dropout	-.121830	.0717569	-.421663	.2483557	-1.69782	.0923463
Infant Mortality	.140334	.0717974	.001936	.0009903	1.95458	.0531472
Unemployment	-.110381	.0855094	-.005098	.0039496	-1.29086	.1994362
High School Grads	.192002	.0944548	.210878	.1037412	2.03273	.0444660
Remedial Enrollment	-.120370	.0774531	-.177375	.1141331	-1.55411	.1230084
Special Education	.106796	.0723668	.405015	.2744437	1.47577	.1428405

4. Performance on the SAT

Using SAT score as the dependent variable, regression analysis number four calculated three of the ten independent variables as predictive. Table 4 presents the regression weights in order of significance.

Table 4: Stepwise Regression Using SAT Score as the Dependent Variable

VARIABLE	BETA	St. Err. of BETA	B	St. Err. of B	t(112)	p-level
Free Lunch	-.650143	.0700306	-202.532	21.81592	-9.28369	.0000000
Gifted Enrollment	.166066	.0678486	215.932	88.22214	2.44759	.0158930
Absenteeism .	113517	.0624449	.797	.43863	1.81787	.0716865

In order to determine factors which influence absenteeism and attrition, regression analyses were performed with the following eight independent variables: (1) eligibility for free/reduced lunch, (2) unemployment rate, (3) gifted enrollment, (4) remedial

enrollment, (5) special education enrollment, (6) % county residents who completed high school, (7) county juvenile arrest rate, and (8) county infant mortality rate.

5. Absenteeism

The fifth regression analysis, using absenteeism as the dependent variable, reported that five of the independent variables were collectively predictive.

Table 5: Stepwise Regression Using Absenteeism as the Dependent Variable

VARIABLE	BETA	St. Err. of BETA	B	St. Err. of B	t (112)	p-level
Free Lunch	-.508538	.0974182	-22.5530	4.32038	-5.22015	.0000008
Dropout Rate	.272021	.0865083	72.9050	23.18527	3.14445	.0021264
Infant Mortality	.289048	.0862774	.3087	.09215	3.35022	.0010983
Gifted Enrollment	-.173733	.0924150	-32.1599	17.10704	-1.87992	.0626941
Special Education	-.099937	.0818065	-29.3483	24.02403	-1.22162	.2243930

6. Dropout Rate

Using dropout rate as the dependent variable, the four independent variables presented in Table 6 emerged as predictive in the sixth regression analysis.

Table 6: Stepwise Regression Using Dropout Rate As The Dependent Variable

VARIABLE	BETA	St. Err. of BETA	B	St. Err. of B	t(116)	p-level
HS Grads	-.208609	.1039156	-.066199	.0329760	-2.00749	.0470633
Absenteeism	.299318	.0903899	.001117	.0003373	3.31141	.0012438
Free Lunch	.291476	.1145377	.048231	.0189529	2.54481	.0122706
Infant Mortality	-.097253	.0921277	-.000388	.0003671	-1.05564	.2933668

7. Gifted Enrollment

Table 7 indicates that all but three (unemployment rate, infant mortality rate, and special education enrollment) were predictive of the dependent variable.

Table 7: Stepwise Regression Using Gifted Enrollment As The Dependent Variable

VARIABLE	BETA	St. Err. of BETA	B	St. Err. of B	t(112)	p-level
HS Grads	.363044	.1027896	.166801	.0472267	3.53191	.0005984
Free Lunch	-.215535	.1117273	-.051638	.0267675	-1.92912	.0562246
Absenteeism	-.158687	.0804691	-.000857	.0004347	-1.97202	.0510505
Remedial	-.127915	.0885822	-.078851	.0546049	-1.44402	.1514999
Juvenile. Arrests	-.082885	.0828167	-.000840	.0008390	-1.00083	.3190488

8. Remedial Enrollment

Table 8 provides the results of the stepwise regression analysis used to determine correlates of remedial enrollment when seven factors were loaded.

Table 8: Stepwise Regression Using Remedial Enrollment as the Dependent Variable

VARIABLE	St. Err. BETA	of BETA	St. Err. B	of B	t(115)	p-level
Free Lunch	.490713	.1136822	.190718	.0441831	4.31653	.0000342
Infant Mortality	-.164502	.0848053	-.001540	.0007938	-1.93976	.0549009
Gifted	-.128794	.0942426	-.208935	.1528842	-1.36662	.1744562
HS Grads	.158078	.1071334	.117822	.0798508	1.47552	.1428539
Unemployment	.132975	.1024113	.004168	.0032101	1.29844	.1967794

Table 8 indicates that, when all variables were considered, there were five predictors of enrollment in remedial programs.

CONCLUSION

The preceding analyses verify strong relationships between school performance and specific community and school characteristics. Specifically, children who attend schools which are located in counties with high unemployment, high infant mortality, high poverty, and low percentages of adult high school graduates typically perform at low levels on standardized mathematics and science tests and do not pass the high school graduation test in mathematics or science on the first attempt. Higher science and mathematics achievement was found in districts with higher percentages of students in gifted classes, lower percentages of students in remedial classes, and low dropout rates. No relationships were found to exist between special education enrollment or juvenile arrest rates and achievement.

Discussion

This study confirms the powerful and interactive influence between education and poverty, infant mortality, employment, and school attrition in Georgia. Students move between and among school, home, and the community with no visible lines of demarcation. Their interactive influence is clear and must be understood to insure the maximum level of student achievement and community growth. Earlier studies verify the influence of neighborhood characteristics on socialization processes (Ainsworth, 2002; Wilson, 1996).

The influence of poverty on educational attainment was widely known and remains alarming. The Census Bureau reported that in 2001, 16.3 percent of Americans under age

18 lived in poverty. This number is even higher in Georgia where one in 6 children is poor (Bureau of the Census, 2002). The long-standing nature of poverty in America causes many to view it as a permanent pathology of a community. Further, many feel helpless to counteract the devastating influences that it has on education. At times, teachers and administrators must be reminded that poor children are no more lacking in academic potential than their affluent peers. These children are not at-risk, but live in risky situations. The most powerful establishment for transforming children out of poverty is the public school - the institution which, by law, all persons between the ages of 6 and 16 must attend. Accordingly, the school must be viewed as an element of metamorphosis, not warehousing.

An assumption of too many educational reforms is that when students' academic achievement is low, the learner is flawed and must be "fixed." Those "fixes" attempt to repair the defective student, as a chiropractor adjusts a bad back or a dentist removes a decayed tooth. After being bombarded with classes and delivery models which inadvertently and consistently tell a learner that he or she is defective, the child may become permanently disillusioned. For too many of these youth, schools are so alienating and disengaging that they are viewed as obstacles rather than opportunities. Stanton-Salazar (2000) suggests that there are institutional and ideological forces that make access to social capital and institutional support within schools and other institutional settings overwhelmingly problematic for many adolescents. A student who finds himself in a disengaging or polemic environment does what humans in similar situations have done since the beginning of time: he disengages - either psychologically or physically.

The study's findings regarding enrollment in gifted and remedial programs and academic achievement are informative. It might be argued that districts with larger numbers of "gifted" students would be expected to have higher test scores. Just as districts with larger numbers of students needing remediation would be expected to have lower test scores. The self-fulfilling nature of such logic must be questioned on a number of levels. Who and what determines "giftedness" and participation in such programs? Institutionalized policies of selection of "gifted" students are frequently based on stereotypes which systematically eliminate specific students from consideration. In documenting that being gifted is contextually and culturally sensitive, Donna Ford speaks of the thousands of young people who are not tapped for inclusion in programs which can revolutionize their lives (1996).

Traditional approaches to remedial education are based on the premise that the learner must adapt to the subject matter. The discipline is viewed as pure, inviolable, and sacred while the learner is flexible, adaptable and able to negotiate. Accordingly, reform efforts rarely examine ways to make the discipline more palatable, rather attempts are made to correct the flawed learner. When a student is unable to demonstrate cognitive and affective behaviors commensurate with the requirements of a discipline, that learner has failed. When a significant number of learners exhibit such behaviors, programs are created with names like "remedial" or "compensatory." In spite of their abundance, there is little evidence of positive affects of deficit-model instructional programs. Remedial programs are so disproportionately dominated by minorities and the poor that they merely

highlight the failure of schools to adequately reach and teach all students in a regular classroom.

National and state school reform laws represent policies enacted at a global level. The appropriate implementation and delivery of these policies rests with school districts, schools, and classrooms. Recognizing that *once size does not fit all*, it is incumbent upon superintendents, principals, and teachers to tailor delivery modes around the documented needs, learning styles, and environmental influences of the client – students. The community and institutional correlates of academic achievement in Georgia must be considered in the development of delivery systems. The landmark works of Paolo Freire (1973, 1985) stress the importance of empowering communities to take control of their schools and work interactively with them. Only then, will all of Georgia's children have a fair chance of participating in and benefiting from the educational experiences offered in their communities. Only then, will all of Georgia's children have a chance to expect a better life for themselves, their families, and future generations. The benefits will be immeasurable.

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