Journal of Urban Learning Teaching and Research, 2016 Vol. 12, pp. 35-46

TOWARD SOCIAL JUSTICE: THE CHARACTERISTICS OF AN EFFECTIVE MATHEMATICS INTERVENTION PROGRAM FOR URBAN MIDDLE SCHOOL STUDENTS

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Abstract

This two-part investigation (a) assessed the impact of the Jaime Escalante Math Program (JEMP), a structured summer mathematics intervention program, on the math achievement of urban middle school students, (b) identified the characteristics of the program that the administrators and teachers perceived to contribute to student achievement, and (c) compared the JEMP characteristics to those found in the literature on effective mathematics intervention programs. A mixed methods approach included analysis of two years of student math assessment data, administrator interviews, and teacher surveys. Quantitative findings indicate that student participants in the JEMP achieved significant growth in mathematics on two measures. Additionally, effective program elements are revealed in the qualitative data including specific classroom instructional strategies used in the JEMP. The results of this study will assist educators developing mathematics intervention programs, particularly for urban secondary students.

Keywords: summer mathematics intervention, voluntary middle school math summer intervention, urban middle school summer math, intensive summer math program

Educators have struggled for years to find solutions for increasing student achievement in mathematics, particularly in schools designated as low performing. These schools are often in urban areas and increasingly comprised of students of color who are living in poverty (Education Trust, http://edtrust.org; Strunk & McEachin, 2014). Despite efforts at the federal, state, and local levels, the literature on school reform acknowledges that an achievement gap continues to exist between these marginalized students and their White, more affluent peers (Schachter, 2013), particularly in math (NCES, 2013). Success stories of individual teachers who have challenged the status quo, raised expectations for students, and provided high quality math instruction demonstrate the potential for substantial increases in student math achievement

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(Battey, 2013). There are few examples, however, of programs that are widespread, serving large numbers of students in urban communities, and significantly raising mathematics achievement over long periods of time (Clarke et al., 2014; Escalante & Dirmann, 1990).

The Jaime Escalante Math Program (JEMP) has provided secondary mathematics intervention and enrichment to students of color and low-income students in urban communities of greater Los Angeles, California for over 35 years. The JEMP is a foundation sponsored by Los Angeles City College that is in partnership with 128 area urban high schools and middle schools maintaining Escalante's original mission of engaging "inner city disadvantaged youth in a demanding academic regimen of pre-college and college mathematics in order to improve matriculation into college" and math related careers (Fernandez, Nguyen, & East Los Angeles College (ELAC) Foundation, 2010, p. iii). Students who are behind in math have the opportunity, through intense summer intervention, to catch-up and excel in a subject that has often been unattainable. Furthermore, according to the JEMP administrators in personal communications, the goal of the program is to work individually with schools to create programs that address the unique needs of their students and, as a result, improve the math instruction in urban schools. Despite the perceived benefits of the JEMP, at the time of this study there had not been any research-based evaluations conducted on the effects of the program on the urban students it serves (F. Fernandez & G. Nguyen, personal communication, December, 31, 2015).
The current study investigates the effectiveness and characteristics of this mathematics intervention program for urban middle school students at one site in Los Angeles over a two-year period. The following research questions guided the study:

1. What impact does the JEMP have on 7th and 8th grade mathematics achievement (Pre-algebra and Algebra) as measured by growth on the diagnostic readiness tests from the Math Diagnostic Testing Project (MDTP) and California's standardized math tests?
2. What aspects of the program do the JEMP administrators and teachers perceive to contribute to student achievement?
3. How do these characteristics compare to the literature on effective mathematics interventions?

Literature Review

Characteristics of Effective Mathematics Programs

Various organizational, structural, and philosophical characteristics of effective mathematics programs are identified throughout the literature. Table 1 displays key characteristics of effective math programs, the characteristics identified in the JEMP, and research that corresponds to each characteristic. Despite the overlap in characteristics identified in the literature, there is limited research on effective mathematics intervention programs for urban youth, particularly those who are underserved in terms of resources at home, school, and within their communities (Gersten, et al, 2009) and even less alignment of practices used in the various programs.

Table 1

Organizational, Structural, and Philosophical Characteristics of Effective Mathematics Programs

Characteristics	The Jaime Escalante Math Program (JEMP) and Corresponding Research
Rigorous Curriculum	Structured curriculum with ability to adapt by school/student[a,b,c,d,f] Acceleration and remediation[a,b,d] High standards for participation[a,e,f] Daily homework[a,d,g,h]
Multiple Assessments	Diagnostic readiness pre/post tests[a,b] Formative assessment/summative assessment[a,b,i] State standardized tests[j]
Engaging Instructional Activities	Real life applications and technology[b,d,e,f,i,k] Hands on, manipulatives, visuals, models[a,d,e,j] Collaborative and cooperative learning experiences[a,b,e,f] Problem based learning/inquiry based learning[a,b,d,e,i,j,k,l] Discourse using the language of math[a,b,d,e,f,g,j,k,m] Purposeful questioning[j,l] Classroom community/team-building[a,b,e,f,k]
Extensive Program: Duration	6-weeks intensive 145-hour summer program[a,c,d]
High Poverty/Minority Participants	Predominantly low-income, minority student populations[a,c,d]
Higher Ed. Affiliation	Partnership with East Los Angeles Community College, Los Angeles, CA[a,b,d]
High Teacher Quality	Bachelor's degree in math and Teaching Credential with 5 years experience[a,c,d] Teachers have cultural awareness of students and/or similar backgrounds[e,j,l]
Targeted Professional Development	High expectations[e,k,l] 3-10 hours of professional development per teacher[c,f] Individualized teacher training based on classroom observations[c,f]
Strong Parental Commitment	Parental written commitment[b,l]
Ongoing Communication with Parents	Continuous communication with parents via phone calls home[f]
Substantial Student Support	College tutors and teachers in every classroom[a,b] Individual academic help and mentoring[a,b,c]

Small groups[a,b,c,d,k]
Small class size: 25 or fewer[b,c,d]
Peer teaching[a,b,c]

[a](Edwards, Kahn, & Brenton, 2001), [b](Timme, Baird, Bennett, Fry, Garrison, & Maltese, 2013), [c](Siddiqui, Gorad, & See, 2014), [d](Tichenor & Plavchan, 2010), [e](Ruiz, 2011), [f](NCTM, 2014), [g](Mathews & Farmer, 2008), [h] (Cooper & Valentine, 2001), [i](Schachter, 2013), [j](Battey, 2013), [k](Bell & Pape, 2012), [l](Robinson, 2013),[m](House, 2005)

Supporting Students through Effective Instructional Practices

The use of appropriate instructional practices is the characteristic of effective mathematics programs found in most of the studies. Research has identified several teaching practices that can increase student achievement in mathematics as displayed in Table 1. Students in urban secondary mathematics classrooms, however, are rarely presented with engaging or challenging lessons. Ruiz (2011) states:

> Traditional pedagogy often bores students, thus turning them off to mathematics… Students are often in mathematics classrooms where low-level curriculum is designed around test-taking skills. Many more are in classrooms where teachers use worksheets, stressing drill, practice, and other 'mind-numbing' strategies (p. 303).

Effective classrooms, in contrast, have teachers who engage students through a variety of activities that facilitate meaning, encourage cooperation, and bring success to all learners.

Students, particularly those who have not had successful experiences in math, must first experience a sense of belonging in the classroom, which occurs through team-building activities. Then as they are engaged in problem-solving using real life applications, technology, manipulatives, visuals, and purposeful questioning they will be more willing to participate in collaborative projects and discourse. Mathematical discourse is identified throughout the literature as key to student understanding and growth in mathematics (Table 1).

Mathematical discourse includes the intentional exchange of ideas through classroom discussion in addition to other forms of visual, written, and verbal communication (NCTM, 2014). "Interactive approaches to instruction, such as class discussions, appear to be correlated positively with mathematics achievement, while less interactive approaches, such as lectures, are negatively associated with achievement" (Matthews & Farmer, 2008, p. 477). Students should be encouraged to talk about math assignments both inside and outside of the classroom because the more time they interact with peers about class assignments, the higher they will achieve (NCTM, 2014). The goal of this strategy is to empower students to participate in group discussions as they grapple with authentic questions and clarify understandings (Bell & Pape, 2012; Matthews & Farmer, 2008).

Methods and Data Sources

Stage 1 – Quantitative Evaluation of the JEMP Program on Student Achievement

Data were collected and analyzed from (a) Math Diagnostic Testing Project (MDTP) pre and post-diagnostic pre-algebra and algebra readiness tests for students who participated in the

study and (b) three years of standardized tests (2011, 2012, and 2013) for students (grades 6-8) who participated in JEMP and for control group students who did not participate. Participants whose scores were used were diverse in terms of race/ethnicity, primarily socio-economically disadvantaged, and came from the two middle schools in the district (see Table 2). The school the treatment and control group students attended during the two years of data collection had an average of 83% of the students who were eligible for free or reduce lunch and 39% of the students who were designated as English Language learners. Those participating in the JEMP attended summer classes at one school designated by the district.

Participants and data collection.

Table 2

Characteristics of Treatment and Control Group Students from the participating Two Urban Middle Schools during two academic school years.

Student Characteristics	2011-2012	2012-2013
African American	0.2%	0.3%
Asian American	57.4%	64.1%
Hispanic	40.7%	34.6%
White	1.7%	1%
Parent Educational Level		
No High School Diploma	27%	28%
High School Diploma	37%	40%
Some College	14%	14%
College Graduate	15%	11%
Graduate Degree	7%	7%
Total Entering 7th Grade	413	440
Total Entering 8th Grade	545	462

MDTP pre and post-diagnostic pre-algebra and algebra readiness tests. Students entering 7th grade (N = 136 for summers of 2011 and 2012) took a pre-algebra diagnostic readiness test at the beginning and end of the six week JEMP (pre and post). Likewise, students entering 8th grade (N = 108 for summers of 2011 and 2012) took an algebra diagnostic readiness test at the beginning and end of the six week JEMP. Reported data is only for students with both pre and post scores.

Comparison of California Standardized Test data (CST) for JEMP participants (treatment group) with non-participants (control group). Students' CST data were utilized for the study (summers of 2011 and 2012) who met the following criteria: (a) scheduled to take pre-algebra in the 7th grade and had end of 6th grade and end of 7th grade CST scores (N = 853) or (b) scheduled to take algebra in the 8th grade and had end of 7th grade and end of 8th grade CST scores (N = 1,007). Participants were assigned to the treatment group if they participated in the JEMP (n = 234 pre-algebra and n = 144 algebra) or control group if they did not (n = 619 pre-algebra and n = 863 algebra). Additionally, there were N = 248 students with CST scores for

grades 6, 7, and 8: $n = 27$ participated in the JEMP for two years (pre-algebra and algebra) and $n = 221$ in the control group who did not participate in the JEMP.

Data analysis.

MDTP. Field-tested for over 30 years and created with the support of Educational Testing Service, MDTP criterion-referenced tests are a valid and reliable indication of the extent to which a student's current mathematical proficiency matches the skills and knowledge needed for success in a course. Descriptive statistical analysis was utilized to compare the pre- and post-diagnostic pre-algebra and algebra tests for participants in summers of 2011 and 2012. According to the MDTP website, a score of 70% shows that a student is adequately prepared for the subsequent math course.

Standardized test data for JEMP treatment group and non-participants.

Pre-algebra. An ANCOVA was conducted to determine if there was a significant difference in grade seven Pre-algebra CST scores due to the main effect of the JEMP treatment, while controlling for grade six mathematics CST scores as the covariate. Because there was a significant difference in grade six CST scores among the grade seven Pre-algebra populations, there was a need to control for this variable.

Algebra. An ANCOVA was conducted to determine if there was a difference in grade eight Algebra CST scores due to the main effect of the JEMP treatment, while controlling for grade seven Pre-algebra CST as the covariate.

Two year participants. An ANOVA was conducted using the 2013 grade eight Algebra CST as the dependent variable, with treatment as the independent variable.

Stage 2 – Administrator Interviews and Teacher Surveys

Participants

The two (one Asian American and one Hispanic) administrators of the JEMP voluntarily elected to participate in one individual and one group semi-structured phone interview, and six (two Asian American and four Hispanic) of the eight teachers who taught in the program during summers of 2011 and 2012 completed the online survey.

Qualitative data collection and analysis

Interviews of 45-60 minutes were conducted with the two administrators asking them to explain the philosophy of the program, how teachers were selected, professional development provided to teachers, required elements of the program, and their perceptions about the curriculum and instruction that attributed to the students' success. From their responses a teacher survey was developed with 17 items (both Likert scale and open-ended). Survey items asked teachers to rate and/or discuss professional development, expectations, and classroom instructional strategies they used in the JEMP. Descriptive statistical analysis was utilized for Likert scale items on the teacher survey.

Interviews were tape-recorded, with tapes transcribed for analysis of content. The two researchers analyzed the two sets of qualitative data—administrator interviews and teacher open-ended survey items—using a constant comparison method to determine common patterns and

themes (Corbin & Strauss, 2008). The characteristics of the JEMP were also compared to effective program characteristics identified in the literature as shown in Table 1.

Findings

Stage 1 – Quantitative Evaluation of the JEMP Program on Student Achievement

MDTP. Data from the MDTP tests indicate that while students, on average, entered the summer JEMP below the readiness level deemed sufficient by the MDTP guidelines (70%), they left the program with the mathematical abilities to be successful in their upcoming pre-algebra or algebra classes. Table 3 illustrates the mean growth for 7th grade students participating in the pre-algebra intervention was from 62.15% to 75.48% readiness and for 8th grade algebra intervention students was from 61.10% to 70.08%.

Table 3

MDTP Pre and Post-diagnostic Pre-algebra and Algebra Readiness Tests out of 40 questions

est	*N*	Mean Score	Maximum Score	Std. Deviation	Percent Correct
Pre-algebra MDTP Pretest	136	24.86	40	7.14	62.15%
Pre-algebra MDTP Posttest	136	30.19	40	7.16	75.48%
Algebra MDTP Pretest	108	30.55	50	8.61	61.10%
Algebra MDTP Posttest	108	35.04	50	8.46	70.08%

Note. Scores for each course reflect data for both summers of 2011 and 2012 combined.

CST. The standardized test results show students who participated in the JEMP performed significantly better than students who did not participate. The ANCOVA pre-algebra results presented in Table 4 indicate a significant difference between groups, $F(1,848) = 17.69$, $p < .001$, $\eta^2 = .020$. The ANCOVA algebra results presented in Table 5 indicate a significant difference between groups, $F(1, 1002) = 4.33$, $p = .038$, $\eta^2 = .004$. The study also found that students who participated in JEMP for two consecutive summers had significantly higher mean scores $F(1, 242) = 9.99$, $p = .002$, $\eta^2 = .039$ on the 2013 grade eight Algebra CST scores than students who received no treatment (see Tables 6 & 7).

Table 4

ANCOVA for Grade Seven Pre-Algebra Single Treatment Study

Source	*df*	MS	*F*	*p*	η^2
Grade Six Math CST scores (covariate)	1	3030217.85	1376.08*	<.001	.619
Treatment	1	38946.88	17.687***	<.001	.020
Within	848	2202.06			

Note. $*p < .05$, $**p < .01$, $***p < .001$

Table 5

ANCOVA for Grade Eight Algebra Single Treatment Study

Source	*df*	MS	*F*	*p*	$ç^2$
Grade Seven Pre-Algebra CST scores (covariate)	1	5566554.57	1598.721*	<.001	.615
Treatment	1	15084.96	4.332*	.038	.004
Within	1002	3481.88			

Note. **p* < .05, ***p* < .01, ****p* < .001

Table 6

ANOVA for Two-Year Longitudinal Study, Using 2013 Grade Eight Algebra CST as the Dependent Variable

Source	*df*	MS	*F*	*p*	$ç^2$
Treatment	1	82992.358	9.99**	.002	.039
Within	242	3296.864			

Note. **p* < .05, ***p* < .01, ****p* < .00

Table 7

Means and Standard Deviations for Two-Year Longitudinal Study

	2011 Grade Six Mathematics CST		2012 Grade Seven Pre-Algebra CST		2013 Grade Eight Algebra CST	
Variable	M	SD	M	SD	M	SD
Group						
Control	[a]361.50	67.84	[b]401.23	76.88	[c]394.20	93.41
Treatment	[a]348.48	40.35	[b]421.56	47.71	[c]455.26	69.68

Note. [a] The 2011 Grade Six Mathematics CST Proficiency Levels: Far Below Basic = 150-252, Below Basic = 253-299, Basic = 300-349, Proficient = 350-414, Advance = 415-600 (California Department of Education, 2012).
[b] The 2012 Grade Seven Pre-Algebra CST Proficiency Levels: Far Below Basic = 150-256, Below Basic = 257-299, Basic = 300-349, Proficient = 350-413, Advance = 414-600 (California Department of Education, 2013).
[c] The 2013 Grade Eight Algebra CST Proficiency Levels: Far Below Basic = 150-252, Below Basic = 253-299, Basic = 300-349, Proficient = 350-427, Advance = 428-600 (California Department of Education, 2014).

Stage 2 – Administrator Interviews and Teacher Surveys

Findings from the administrators and teachers reveal that the JEMP is in alignment with the effective characteristics of mathematics programs identified in the literature as shown in Table 1. The data collected highlight the importance of engaging instructional strategies, particularly collaborative learning and discourse. Student support is also seen as essential in the JEMP.

Interviews and survey responses suggest that effective mathematics teaching in the JEMP provides the support that students need to "*catch-up and excel in math*" (Administrator). The use of formative assessments, summative assessments, student engagement, and using data to inform instruction were common practices that emerged from the administrators and were confirmed by the teachers on the surveys as being used and effective. Both groups emphasized the importance of employing a variety of strategies with students including: engaging in hands-on and creative activities, providing practical applications, spending approximately 30% of the time practicing the material with two hours of daily homework, teaching students how to be thinkers, giving feedback, and emphasizing acceleration as well as remediation/high expectations. The strongest themes derived from the administrator and teacher data were the importance of collaborative group work and opportunities for discussion. Teachers shared: "*My students sit in groups every day and are allowed to work collaboratively."* And, *"Peer teaching helps students teach and learn from one another."* An administrator commented, *"The most effective aspect in JEMP for students is the collaborative learning environment. Students teach other students and speak using mathematical language."*

Students are also provided individual and small group support within the classroom from math tutors who are college mathematics majors assigned to each class. The tutors also assist teachers with grading so that students receive immediate feedback on their work. Finally, the classroom learning environment is enhanced as tutors support classroom management.

Discussion

The quantitative MDTP assessment data show that the majority of middle school students who participated in the JEMP entered the summer intervention class at a level in which they were not ready for the class they were assigned to take in the fall. After participation in the JEMP, the averages for the two years of the study show students had increased to a level of readiness to be successful in their next math class. Additionally, JEMP participants had significantly greater gains in their math achievement on standardized tests than their peers who did not participate. The interviews and surveys reveal the aspects of the program, particularly instructional strategies that the administrators and teachers perceive as key to students' high achievement gains through the JEMP summer intervention.

Effective Mathematics Intervention to Support Students

Traditional math classroom approaches in which the teacher does most of the talking and activities are primarily paper and pencil-based are ineffective (Lewis, 2014), especially with underserved urban students who have not been successful in math (Battey, 2013). JEMP teachers, in contrast, are trained to have classrooms that are student centered, where the students are doing most of the talking and are often collaborating in groups (F. Fernandez, personal

communication, December, 31, 2015). JEMP teachers engage students in the learning process by promoting discourse and the use of academic language. "Language plays an integral part in understanding and becoming proficient in mathematics" (Impecoven-Lind & Foegen, 2010, p. 32). Academic language allows students to conceptualize the lesson by working collaboratively with fellow classmates. Bell and Pape (2012) explain, "Dialogic episodes occur when participants in classroom discourse exchange ideas in a non prescriptive way, expanding on or modifying the contributions of others" (p. 426).

Many of the other classroom strategies identified by the administrators and teachers as effective in the JEMP correspond to those found in the literature displayed in Table 1. For example, Evans, Zeun, and Stanier, (2014), like the JEMP teachers and administrators, acknowledge the importance of using formative and summative assessments to guide instruction. It is the unique combination of the JEMP characteristics, however, that have resulted in the program's long-term success as evident in the findings of this study.

Educational Importance

Mathematical competence has been identified by countries throughout the world as one of the key proficiencies necessary for personal fulfillment, active citizenship, social inclusion, and employability in modern society (European Parliament and Council, 2006). The National Council of Teachers of Mathematics' (NCTM) website states: "Every student deserves an excellent program of instruction in mathematics that challenges each student to achieve at the high level required for productive citizenship and employment." Despite the importance of math education for an individual's future, many students, particularly those in urban communities, are denied the right to a quality math education (Education Trust, 2011; NCTM, 2014). It is time to invest in urban children's futures by providing them with opportunities and support to achieve high levels of mathematics learning that will eliminate the persistent ethnic, racial, and income achievement gaps.

The findings from this study reveal key characteristics of how the Jaime Escalante Math Program provides urban youth who have often been deprived of a quality educational experience in math an opportunity to succeed. School districts should utilize the attributes of this program as they seek to better educate not only underrepresented students but all students. Partnerships with local colleges can support these intervention efforts as outlined in the literature. This information can be of value to educators seeking justice through providing intervention programs to students, particularly those who have had few resources, so that they can also excel in math and life.

References

Battey, D. (2013). "Good" mathematics teaching for students of color and those in poverty: The importance of relational interactions within instruction. *Educational Studies in Mathematics, 82*(1), 125-144. DOI: 10.1007/s10649-012-9412-z

Bell, C., & Pape, S. (2012). Scaffolding students' opportunities to learn mathematics through social interactions. *Mathematics Education Research Journal, 24*(4), 423-445. DOI: 10.1007/s13394-012-0048-1

California Department of Education, (2012). *California Standards Test technical report: Spring*

2011 administration (Contract No. 5417). Sacramento, CA: Assessment Development and Administration Division. Retrieved from http://www.cde.ca.gov/ta/tg/sr/documents/csttechrpt2011.pdf

California Department of Education, (2013). *California Standards Test technical report: Spring 2012 administration* (Contract No. 5417). Sacramento, CA: Assessment Development and Administration Division. Retrieved from http://www.cde.ca.gov/ta/tg/sr/documents/cst12techrpt.pdf

California Department of Education, (2014). *California Standards Test technical report: Spring 2013 administration* (Contract No. 5417). Sacramento, CA: Assessment Development and Administration Division. Retrieved from http://www.cde.ca. http://www.cde.ca.gov/ta/tg/sr/documents/cst13techrpt.pdf

Clarke, B., Doabler, C. T., Cary, M. S., Kosty, D., Baker, S., Fien, H., & Smolkowski, K. (2014). Preliminary evaluation of a tier 2 mathematics intervention for first-grade students: Using a theory of change to guide formative evaluation activities. *School Psychology Review, 43(2),* 160-177.

Cooper, H. & Valentine, J. C. (2001). Using research to answer practical questions about homework. *Educational Psychologist, 36*(3), 143-153. DOI: 10.1207/S15326985EP3603_1

Corbin, J. M. & Strauss, A. L. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.). Los Angeles, CA: Sage Publications, Inc.

Edwards, T., Kahn, S., & Brenton, L. (2001). Math Corps summer camp: An inner city intervention program. *Journal of Education for Students Placed at Risk, 6*(4), 411-426. DOI: 10.1207/S15327671ESPR0604_6

Escalante, J., & Dirmann, J. (1990). The Jaime Escalante Math Program. *The Journal of Negro Education*, *59*, 407-423.

European Parliament and Council. (2006). *Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning*. Official Journal of the European Union. L394, 30.12.2006. Retrieved on April 27, 2016 from http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32006H0962&from=EN

Evans, D. J.R., Zeun, P., & Stanier, R. A. (2014). Motivating student learning using a formative assessment journey. *Journal of Anatomy*, *224*(3), 296-303. DOI: 10.1111/joa.12117

Fernandez, F., Nguyen, G., & East Los Angeles College (ELAC) Foundation (2010). *Jaime Escalante Math Program algebra readiness workbook.* Los Angeles, CA: LBD Publishers.

Gersten, R. M., Beckmann, S., Clarke, B., Foegen, A., March, L., Star, J. R., & Witzel, B. (2009). *Assisting students struggling with mathematics: Response to intervention (RTI) for elementary and middle schools* (Practice Guide Report No. NCEE 2009 – 4060). Washington, DC: U.S. Department of Education, National Center for Education Evaluation and Regional Assistance.

House, J. D. (2005). Motivational qualities of instructional strategies and computer use for mathematics teaching in Japan and the United States: Results from the TIMSS 1999 Assessment. *International Journal of Instructional Media, 32*(1), 89-104.

Impecoven-Lind, L. S., & Foegen, A. (2010). Teaching algebra to students with learning disabilities. *Intervention in School and Clinic*, *46*(1), 31-37. DOI:

10.1177/1053451210369520

Lewis, G. M. (2014). Implementing a reform-oriented pedagogy: Challenges for novice secondary mathematics teachers. *Mathematics Education Research Journal, 26*(2), 399-419. DOI: 10.1007/s13394-013-0092-5

Matthews, M. S., & Farmer J. L. (2008). Factors affecting the algebra 1 achievement of academically talented learners. *Journal of Advanced Academics*, *19*(3), 472-501. DOI: 10.4219/jaa-2008-810

National Center for Education Statistics (NCES) (2013). *The Nation's Report Card: A First Look: 2013 Mathematics and Reading* (NCES 2014-451). Institute of Education Sciences, U.S. Department of Education, Washington, D.C.

National Council of Teachers of Mathematics, (2014). *Principles to actions: Ensuring mathematical success for all.* Reston, VA: National Council of Teachers of Mathematics.

Robinson, K. (2013). Early disparities in mathematics gains among poor and non-poor children: Examining the role of Behavioral engagement in learning. *The Elementary School Journal, 114(1),* 22-47. DOI: 10.1086/670737

Ruiz, E. C. (2011). Motivation of Latina/o students in algebra 1: Intertwining research and reflections. *School of Science and Mathematics, 111*(6), 300-305. DOI: 10.1111/j.1949-8594.2011.00090.x

Schachter, R. (2013). Solving our algebra problem: Getting all students through algebra 1 to improve graduation rates. *District Administration, 49*(5), 43-46.

Siddiqui, N., Gorard, S., & See, B. H. (2014). Is a summer school programme a promising intervention in preparation for transition from primary to secondary school? *International Education Studies*, *7*(7), 125. DOI: 10.5539/ies.v7n7p125

Strunk, K. O., & McEachin, A. (2014). More than sanctions: Closing achievement gaps through California's use of intensive technical assistance. *Educational Evaluation and Policy Analysis 36*(3), 281-306. DOI: 10.3102/0162373713510967

Tichenor, M., & Plavchan, J. (2010). Summer camps: A fun way to reinforce math skills. *Journal of Instructional Psychology, 37(1)*, 71-75.

Timme, N., Baird, M., Bennett, J., Fry, J., Garrison, L., & Maltese, A. (2013). A summer math and physics program for high school students: Students performance and lessons learned in the second year. *The Physics Teacher 51,* 280-284. http://dx.doi.org/10.1119/1.4801354