

MARIAN UNIVERSITY
Indianapolis

SUMMER LEARNING INSTITUTE

Summer 2016 Math Results

Our Funders & Partners:

Central Indiana Community Foundation
Indianapolis Foundation
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Marion County Commission on Youth



Marian University

...profoundly transforming lives, society, and the world

3200 Cold Spring Road, Indianapolis, IN 46222

MARIAN UNIVERSITY

Indianapolis

Summer Learning Institute

Director Dr. Judy Bardonner

Marian University's Summer Learning Institute's mission is to stop and reverse summer learning loss.

The SLI ...

1. Offers a unique vehicle for helping to build the STEM infrastructure in Indianapolis.
 - Provides STEM instruction to underrepresented, under-served youth enrolled in SYPF summer programs.
 - SLI teachers come from many colleges and universities. In 2016 SLI trained and sent out 24 undergraduate and graduate students from 5 universities.
 - Diversity of student teachers - 4 African American males, 7 African American females, and 1 Hispanic female. These wonderful teachers provided powerful role models for SYPF youth and gained great understanding of the importance of providing quality summer programs for youth.
2. Conducts longitudinal research on summer math learning loss
 - SLI continued its 5 year longitudinal research on promising practices for stopping and reversing summer learning loss. In August 2016, RAND released a national study with findings that high attenders made a 15 percent gain in math benefits during the summer.
 - One of the questions we are still looking to answer is the number of summer math hours required to stop math learning loss
 - Summer 2016 *AIMSweb* data indicate that children who participated in 8 hours or more of math activities scored significantly higher than children who participated in fewer hours of math.



Math Achievement Findings

Judy Bardonner, Ph.D., Director, Center for Community Learning; Jeff Kellogg, Ph.D., Professor of Psychology,
Marian University

AIMSweb® Test Data (Pearson, 2012).

The AIMSweb, which is a short-term metric, showed significant increases in scores from pretest to post-test. The median dosage of math instruction was eight hours. Children who participated in 8 (the median value) or more hours of math activities over the course of the summer scored significantly higher on post to pretest differences than did children who participated in fewer than 8 hours, $F(1, 374) = 4.97, p < .05, \eta^2 = .013$. For children who participated in 8 hours or more of math activities, math skills improved, on average, 4.01 ($s = 8.59$), an average rate of increase (ROI) of .50 points per week, while for children who participated in fewer than 8 hours of math activities, math skills improved, on average, 2.22 ($s = 6.93$), an average ROI of .28 points per week.

Based on analyses of AIMSweb nationally normed progress monitoring scores, 79% of the children maintained math skills, gained math skills, or tested above grade level on math skills; 21% lost math skills.

Overall, AIMSweb posttest scores were higher than pretest scores by an average of 2.92 ($s = 7.66$), $t(375) = 7.39, p < .001$, *Cohen's d* = .38.

It is interesting to note that only one program, FM, had AIMSweb pretest scores that were higher than the post-test scores.

Wide Range Achievement Test 4 Data (WRAT4) (Wilkinson & Robertson, 2006)

The *Wide Range Achievement Test 4*, which is a year-long metric, showed a significant decrease in standardized scores from pretest to post-test, but showed no significant change in grade-level. *WRAT4 math subtest data* math subtest standard posttest scores were lower than pretest scores by an average of -1.29 ($s = 8.41$), $t(319) = 2.74, p < .01$, *Cohen's d* = .15.

WRAT4 grade equivalent posttest scores showed no learning loss as scores were not significantly different from pretest to posttest, $p > .05$. This summer, the lack of regular attendance of students was challenging for the Summer Learning Institute; and therefore, the dosage of math instruction varied greatly from program to program. Attendance also impacted data loss. Over 300 subjects' data were removed from the study because of missing values on pre or post WRAT standard scores.

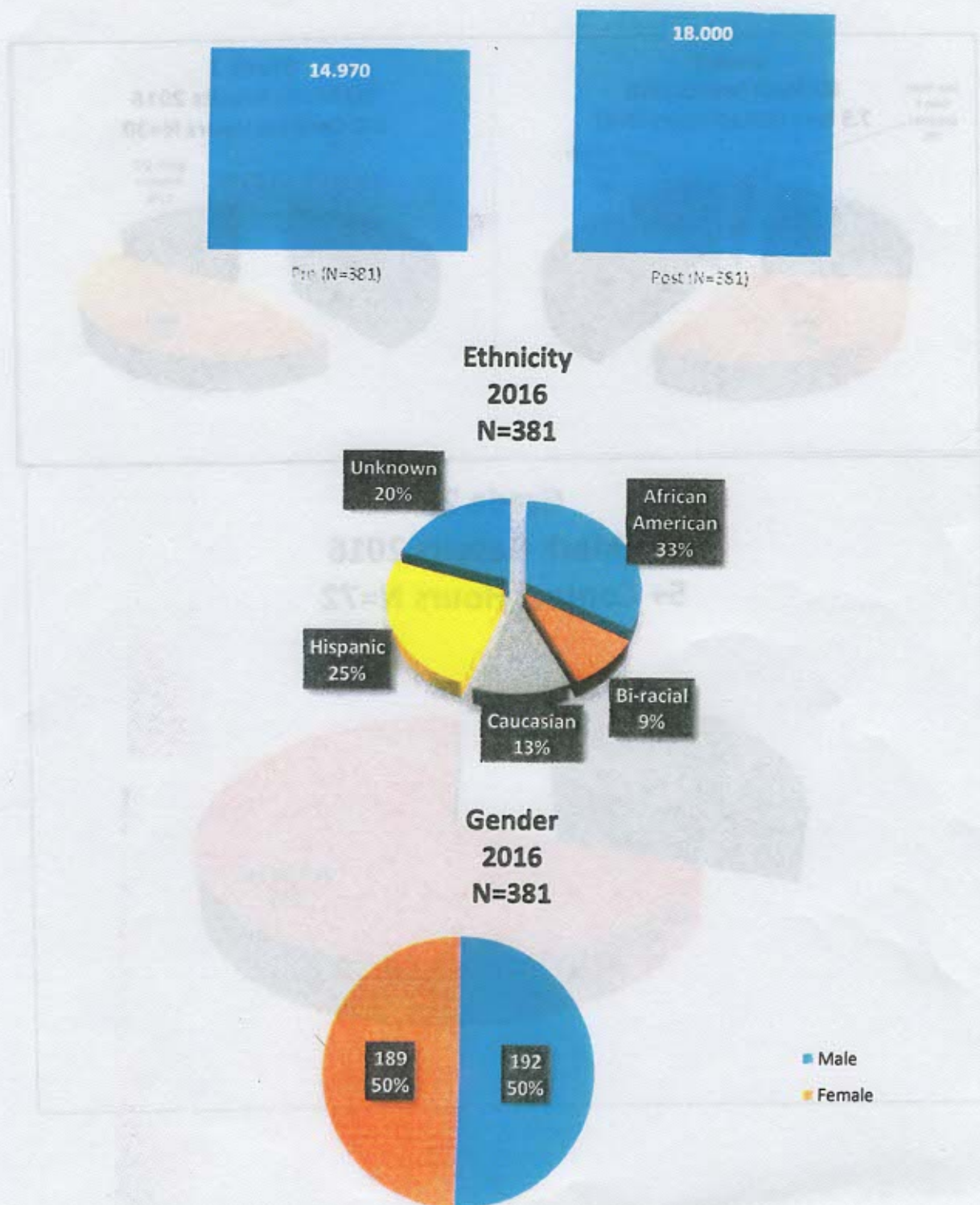
In all of the analyses, for any individual whose *WRAT 4* standard score posttest to pretest difference that was more than two standard deviations above or below the mean was excluded from all analyses due to the extreme nature of those scores. In addition, any individual who did not take both the pretest and posttest was excluded from all analyses.

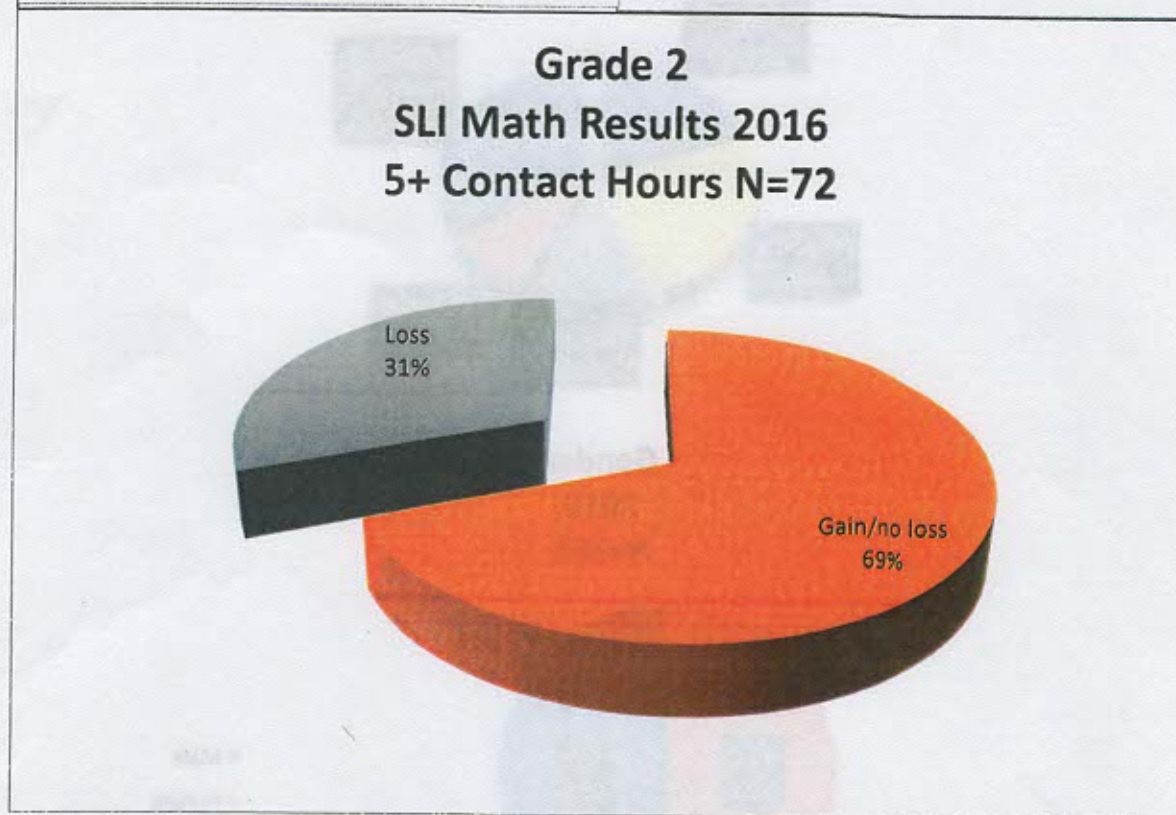
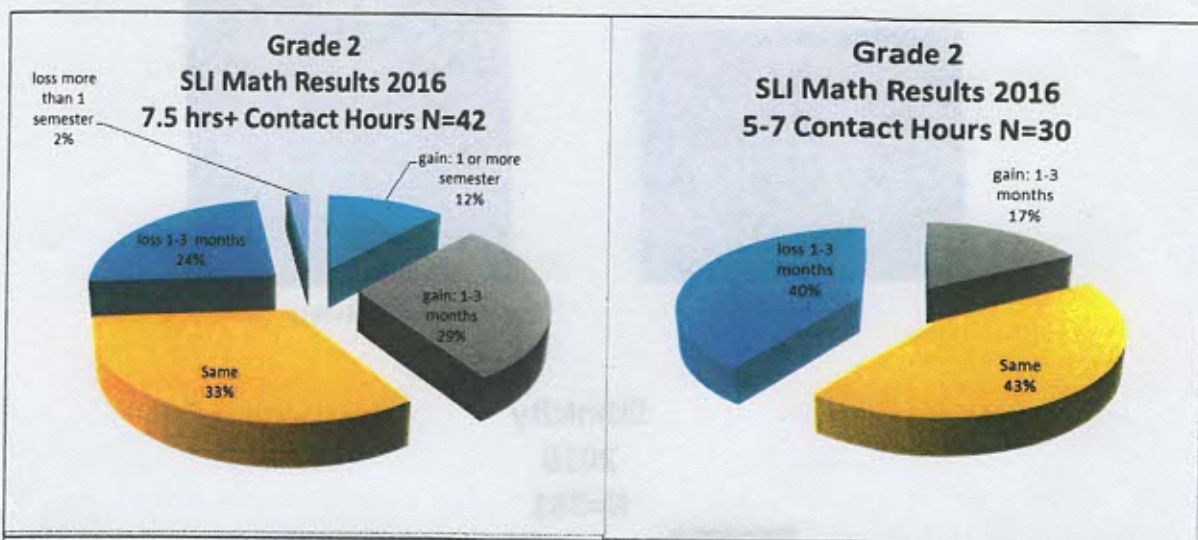
- 1) Data indicate that there was no difference in summer learning loss based on hours of math activities as measured by the *Wide Range Achievement Test 4 (WRAT 4)* math subtest (Wilkinson & Robertson, 2006) standard scores and grade equivalent scores;

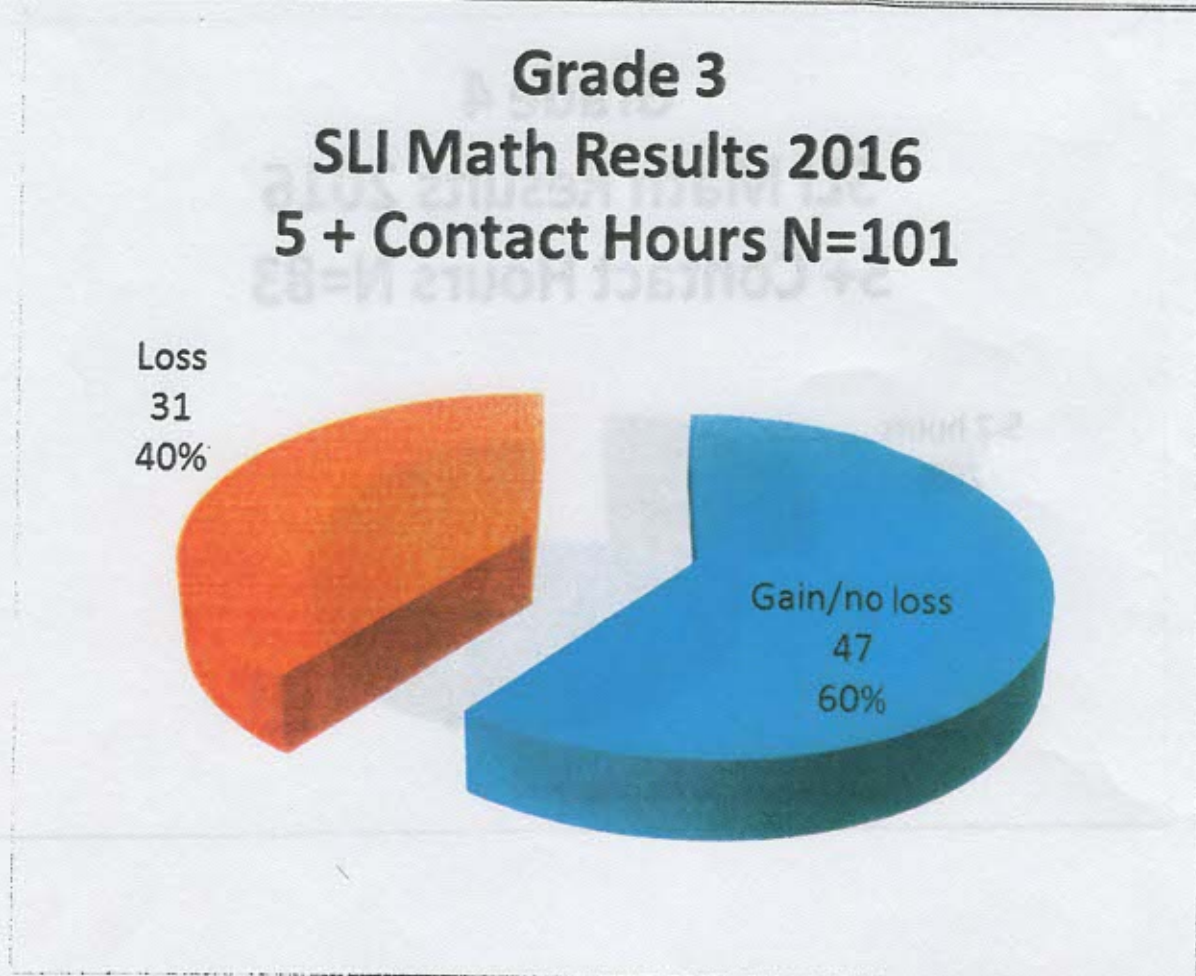
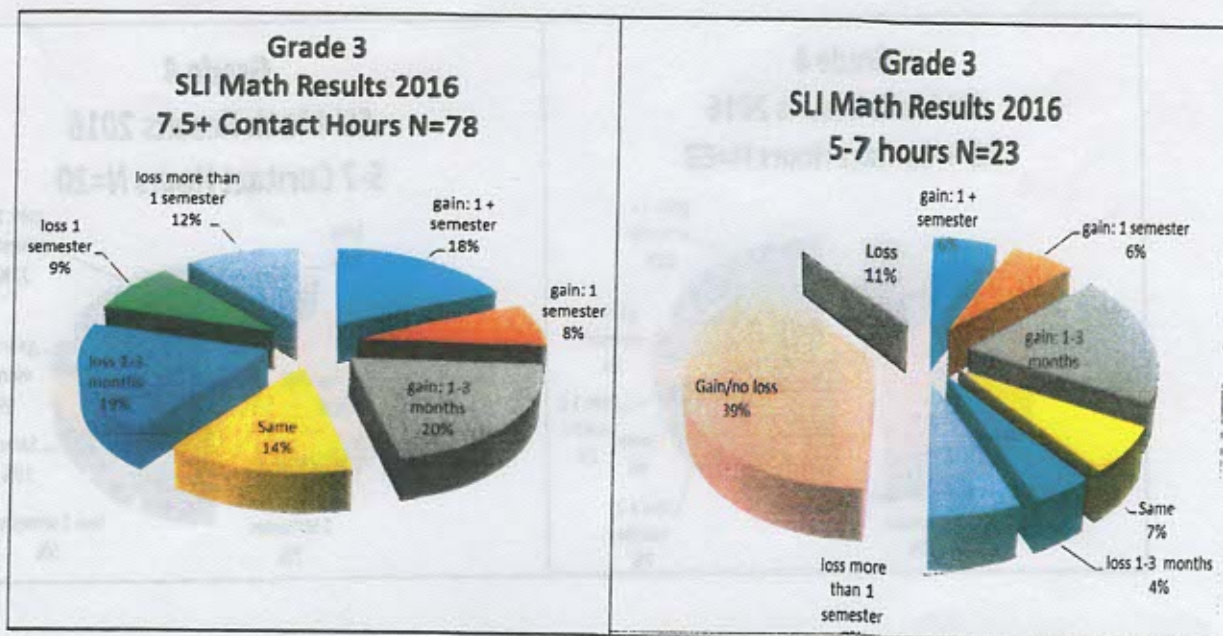
however, there was improvement in math skills based on hours of math activities as measured by *AIMSWEB progress monitoring* scores (Person, 2012).

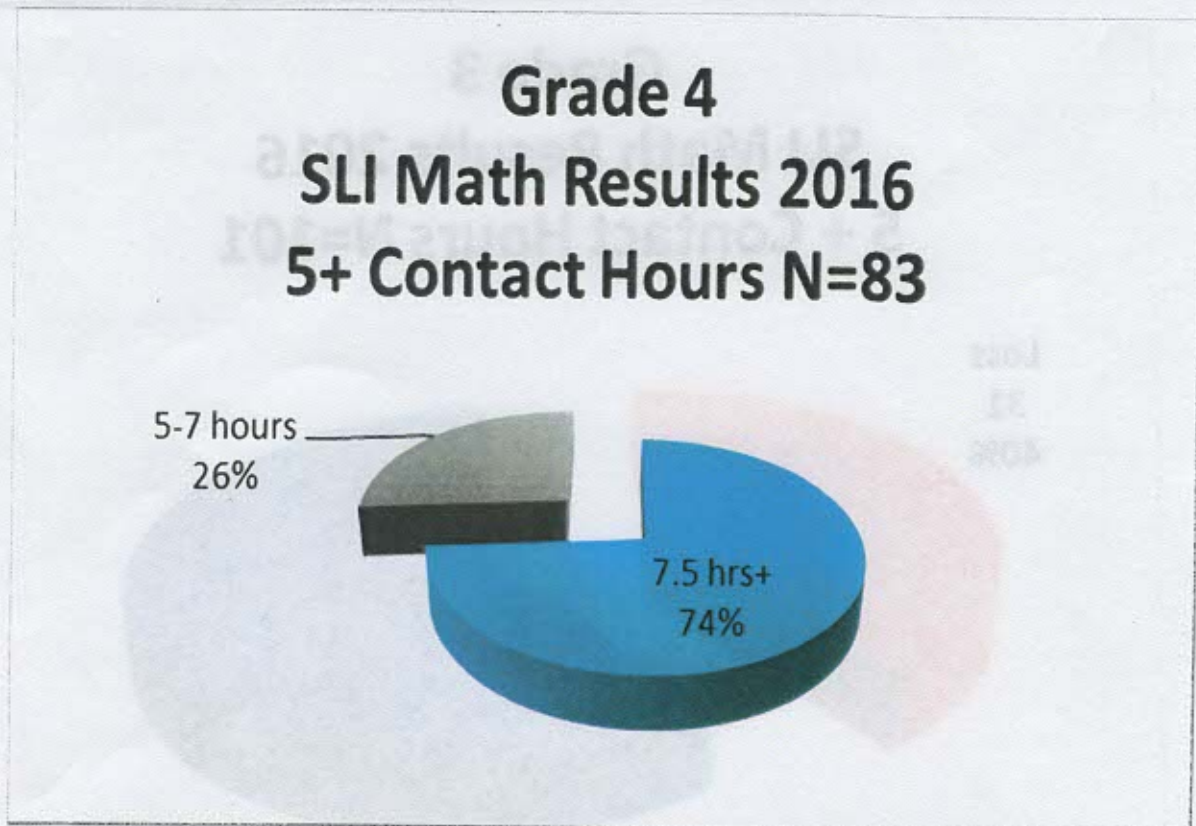
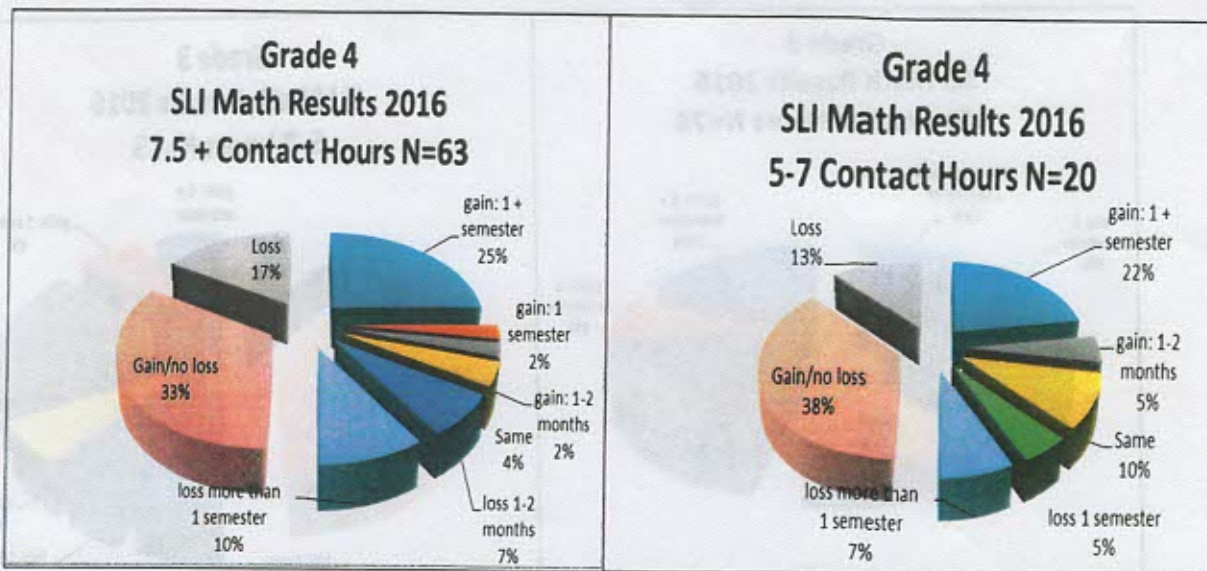
- Overall, *AIMSWEB* posttest score were higher than pretest scores by an average of 2.92 ($s = 7.66$), $t(375) = 7.39$, $p < .001$, *Cohen's d* = .38. Unfortunately, *Wide Range Achievement Test 4 (WRAT 4)* math subtest (Wilkinson & Robertson, 2006) standard scores showed the opposite pattern. Overall, *Wide Range Achievement Test 4 (WRAT 4)* math subtest standard posttest scores were lower than pretest scores by an average of -1.29 ($s = 8.41$), $t(319) = 2.74$, $p < .01$, *Cohen's d* = .15. Also, grade equivalent posttest scores were not significantly different from pretest to posttest, $p > .05$.
 - In addition, there was a difference based on the number of hours of summer math activities for *AIMSWEB* pre to posttest differences. Children who participated in 8 (the median value) or more hours of math activities over the course of the summer scored significantly higher on post to pretest differences than did children who participated in fewer than 8 hours, $F(1, 374) = 4.97$, $p < .05$, $\eta^2 = .013$. For children who participated in 8 hours or more of math activities, math skills improved, on average, 4.01 ($s = 8.59$), an average rate of increase (ROI) of .50 per week, while for children who participated in less than 8 hours of math activities, math skills improved, on average, 2.22 ($s = 6.93$), an average ROI of .28 per week.
- 2) Significant performance differences at program sites seem to indicate that smaller teacher/student ratio may be a factor in stopping summer learning loss.
- Using one-way, between treatments ANOVA, there were statistically significant differences found between 11 specific summer programs on the pretest to posttest difference in the *AIMSWEB progress monitoring* scores (Person, 2012), $F(10, 345) = 2.865$, $p < .01$, $\eta^2 = .076$. The specific programs produced significantly different change scores (pretest-posttest) in *AIMSWEB progress monitoring* scores. Students attending different program sites produced significantly different *AIMSWEB progress monitoring* scores.
 - Post hoc comparisons indicate that children participating at FM had significantly different summer loss in *AIMSWEB progress monitoring* scores from those participating at ET ($p < .01$), SJA ($p < .05$), and SH ($p = .001$); in fact, FM was the only site to have pretest scores that were higher than posttest score on average, $M_{\text{post-pre}} = -1.77$, $s = 4.79$. Students at ET ($M_{\text{post-pre}} = 6.55$, $s = 9.15$), SJA ($M_{\text{post-pre}} = -4.13$, $s = 5.53$), and SH ($M_{\text{post-pre}} = 4.81$, $s = 8.53$) showed significantly greater increase in their scores through the summer math activities. In fact, every program site showed higher posttest than scores except FM.
 - Taken together, these results indicate that the specific program site did lead to a difference in *AIMSWEB progress monitoring* scores pre to posttest difference scores with ET, SH, and SJA performing better (greater posttest *AIMSWEB progress monitoring* scores than pretest scores) than FM and the more global categorization based on number of hours of instruction into two categories based on hours of exposure resulted in significantly greater grow in *AIMSWEB progress monitoring* scores differences pre to posttest.
 - This result suggests that the implementation of the program at ET, SH, and SJA was more effective than at FM and that **exposure to treatment of at least 8 hours improved math retention.**

2016 SLI AIMSweb Growth Pre/post Mean Scores





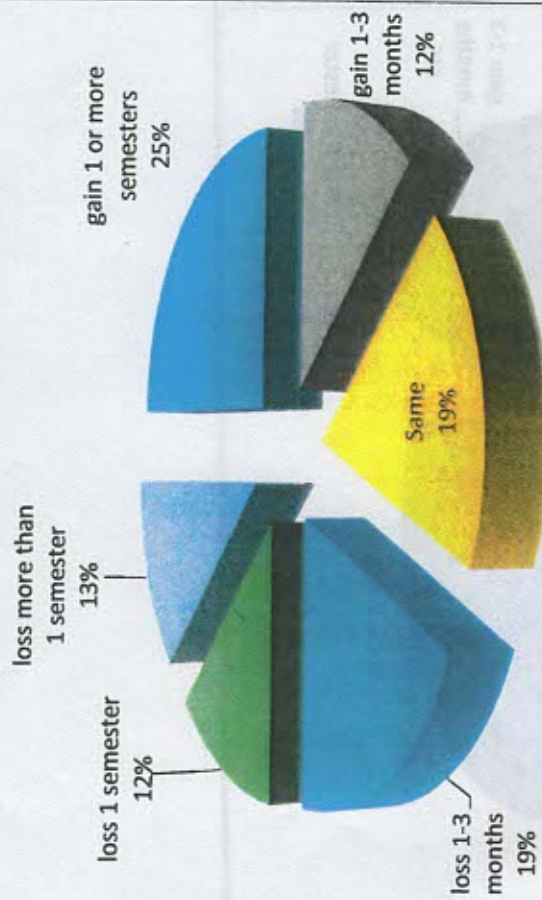




Grade 5

SLI Math Results 2016

7.5 hrs+ Contact Hours N=16



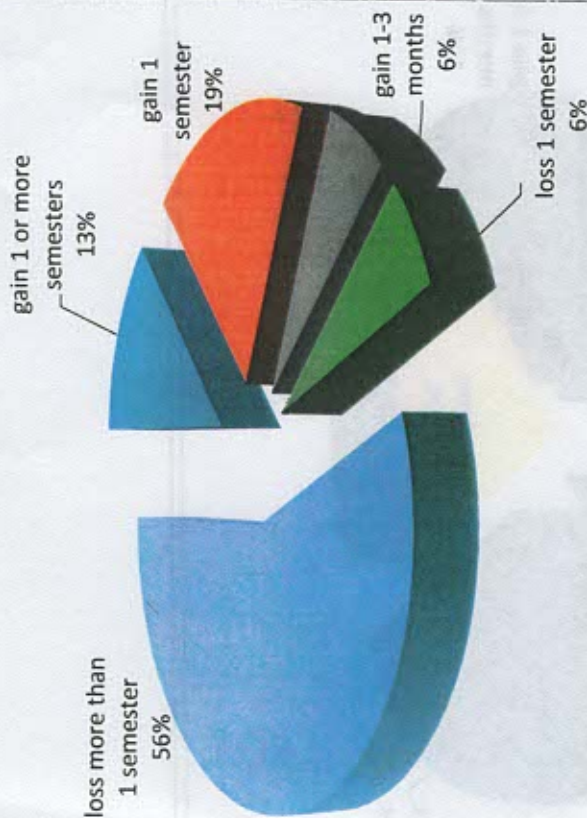
Grade 5

SLI Math Results 2016

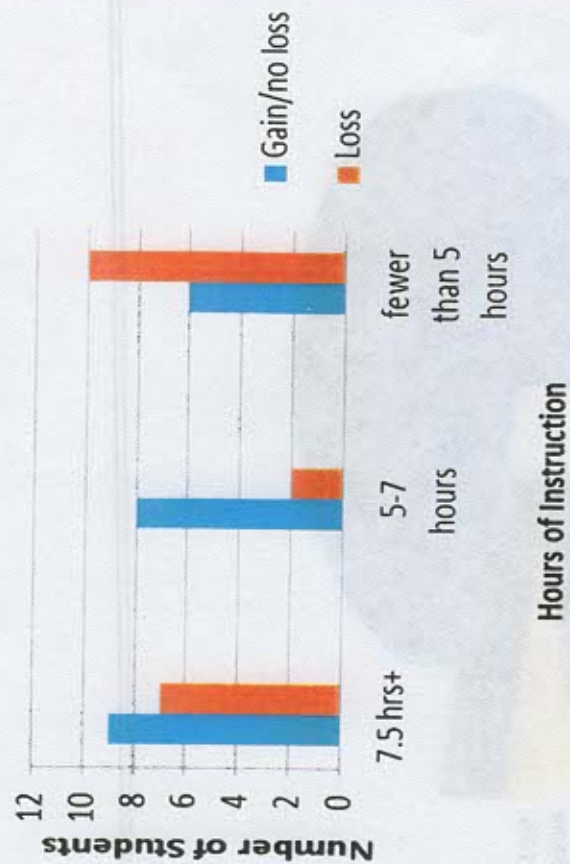
5-7 Contact Hours N=10



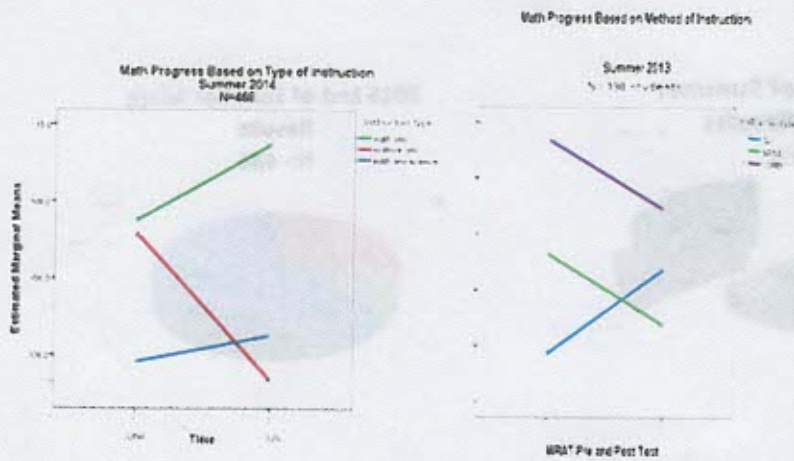
Grade 5 SLI Math Results 2016 Fewer than 5 hours Contact Hours N=16



Grade 5 SLI Math Results N=42

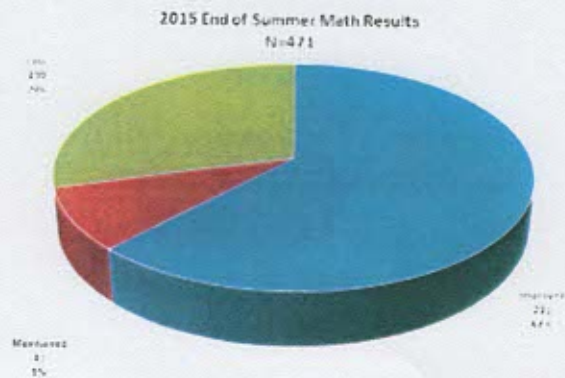


Past Research



2015 ATMSweb Results

71% (N=471) remained at or gained at least 1 grade level

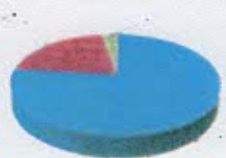


Results of WRAT by Year 2011-2015

**2011 Overall Progress
N=210**



**2012 Overall Progress
N=662**



**2013 Overall Progress
N=398**



**2014 End of Summer
Math Results
N=304**



**2015 End of Summer Math
Results
N= 486**

