AN EVALUATION OF MATIFIC USE IN GRADES TWO AND THREE

A Study of Matific Product Effectiveness

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SEGMEASUREMENT

BUILDING BETTER ASSESSMENTS / EVALUATING PRODUCT EFFECTIVENESS

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Executive Summary

Overview

During the 2016-2017 school year, SEG Measurement conducted a year-long study to evaluate the effectiveness of Matific, an instructional application designed to teach K to 6 math.   Approximately 1477 grade two and three students enrolled in the Hampton City school district in Virginia participated in the study.

Students in classes using the Matific program improved their math skills significantly more than students in classes receiving instruction without Matific. The overall effect size was .19, the effect size for grade two was .24 and the effect size for grade three was .13.

Study Design

The study compared the growth in mathematics skills for students in classes using the Matific program (treatment group) and those in comparable classes following traditional instructional practice without using Matific (control group) using a quasi-experimental design.

Students in both the treatment and control group were administered a pretest of mathematic skills in the fall of 2016 and a posttest in the Spring of 2017. The treatment group classes instructed students using Matific, while the control group instructed students using traditional instructional practice. Students in both groups then completed a posttest of mathematic skills.

The mathematics growth for Matific users and non-users was compared statistically using Analysis of Covariance (ANCOVA). ANCOVA provides a comparison between the treatment and control group students, while adjusting for any potential differences in students' initial ability. Specifically, we examined the difference in the Spring 2017 scores (dependent variable) between the treatment and control groups (independent variable) while controlling for the initial ability of the students from fall 2016 (covariate).

Study Results

Students that used Matific showed significantly more growth in math skills than comparable classrooms that did not use Matific. Overall, students in classes using Matific showed about 4 points more growth in mathematics skills than students in classes that did not use Matific, or about a quarter of a standard deviation (effect size .19). There was no difference in Matific effectiveness among students of different genders and ethnicities.

Students in grade two classes using Matific showed about 4 points more growth in mathematics skills than students in classes that did not use Matific, or about a quarter of a standard deviation (effect size .19). In grade three, students in classes using Matific showed about 3 points more growth in mathematics skills than students in classes that did not use Matific, or less than a quarter of a standard deviation (effect size .14).

The average (mean) mathematics test scores for the treatment and control group students are shown in Figures 1, 2 and 3.

Mathematics Skills Growth

	Treatment	Control
■ Mathematics Skills Growth	77.23	73.67

Scores (0-100 Scale)

Study Group Scores Comparison

Mathematics Skills Growth

	Treatment	Control
■ Mathematics Skills Growth	81.06	77.15

Scores (0-100 Scale

Study Group Scores Comparison

Mathematics Skills Growth

	Treatment	Control
■ Mathematics Skills Growth	73.63	71.1

Scores (0-100 Scale)

Study Group Scores Comparison
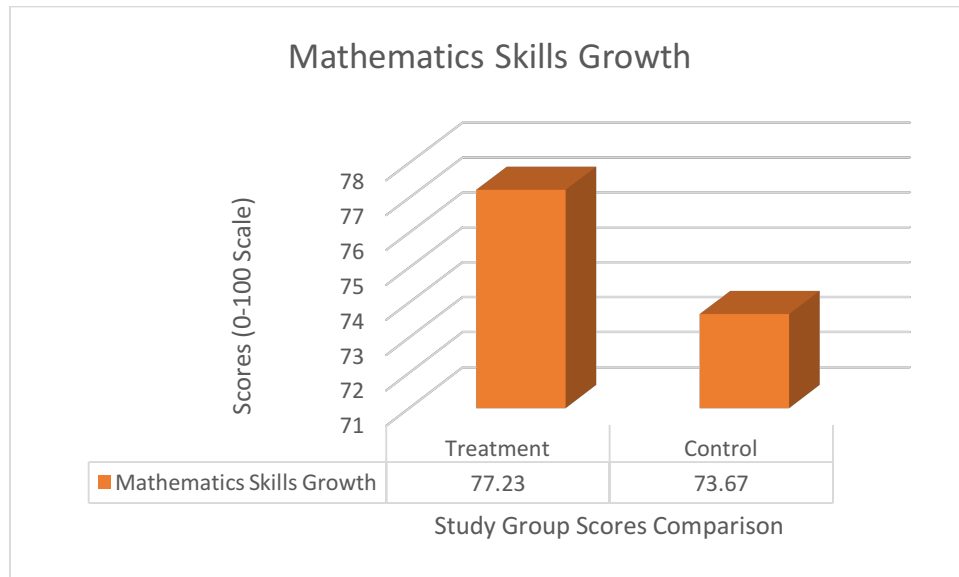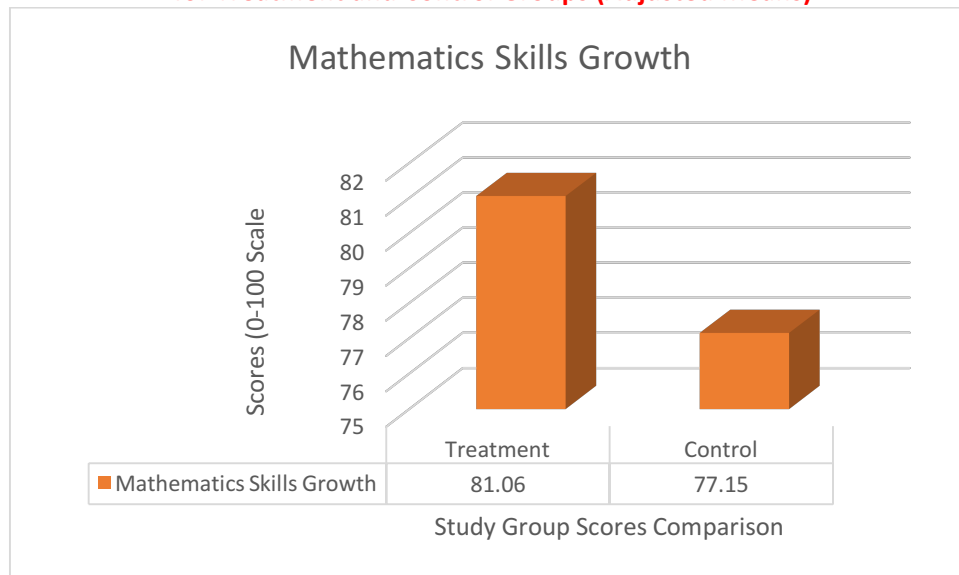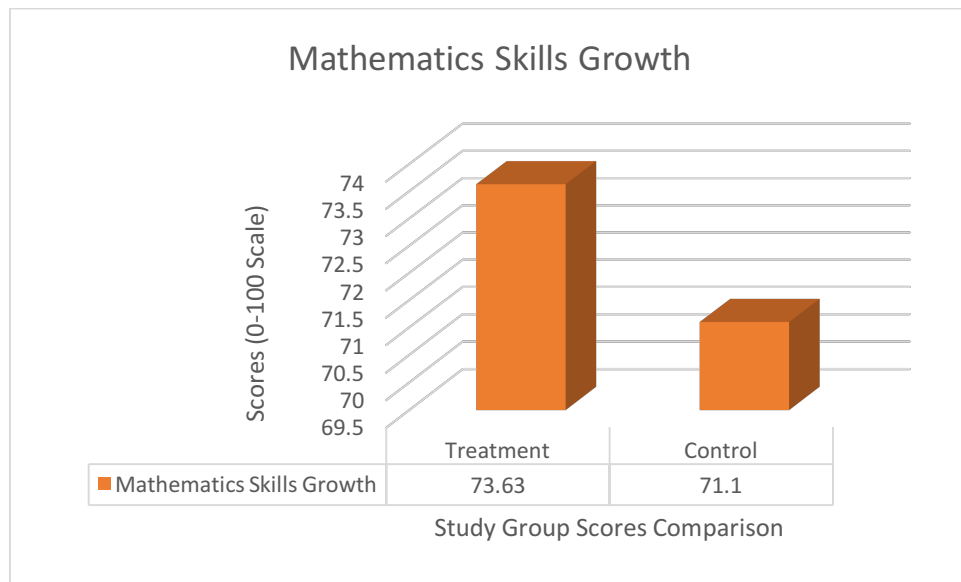
Teacher Perceptions

Most teachers reported plans to use Matific in the future and recommend Matific to other teachers. About four out of five (78%) of the teachers who used Matific in the study indicated that they are likely to use Matific in the future and nearly all (89%) indicated that they would recommend Matific to other teachers.

Conclusion

Students in classes using the Matific program improved their math skills significantly more than students in classes receiving instruction without Matific. The results support the effectiveness of Matific use in improving grade two and three students' math skills.

An Evaluation of Matific Use in Grades Two and Three: A study of Matific Product Effectiveness

Introduction

During the 2016-2017 school year, SEG Measurement conducted a year-long study to evaluate the effectiveness of the Matific product in improving student's mathematics skills. Matific is an instructional application designed to teach K to 6 math. Approximately 1477 grade two and three students enrolled in the Hampton City school district in Virginia participated in the study.

The study compared the growth in mathematics skills for students in classes using the Matific product (treatment group) and those in comparable classes following traditional instructional practice without using Matific (control group). Students in both the treatment and control group were administered a pretest of mathematic skills. Then treatment group classes instructed students using Matific, while the control group instructed students using traditional instructional practice. Students in both groups then completed a posttest of mathematic skills. The assessment results were used to compare the level of growth for Matific users and non-users, adjusting for the initial ability level of the students.

Study Design

The study employed a treatment/control, pre/post quasi experimental study of Matific effectiveness. The growth in mathematics skills of students in classes using Matific was compared to that of students in comparable classes that did not use Matific, adjusting for the initial ability of the students.

Research Questions

1. Do students, overall, in classes using Matific increase their mathematics skills more than students in classes following traditional practice?
2. Do students in grade two classes using Matific increase their mathematics skills more than students in classes following traditional practice?
3. Do students in grade three classes using Matific increase their mathematics skills more than students in classes following traditional practice?
4. Is Matific more effective for either boys in girls in increasing mathematics skills?
5. Is Matific more effective for any ethnic group in increasing mathematics skills?
6. To what extent do teachers perceive Matific effective?

The first five research questions were studied by comparing the performance of students using Matific and those who did not use Matific using Grade 2 and Grade 3 Hampton City District Assessment. Question 6 was assessed by surveying teachers participating in the study through an online survey instrument.

Figure 4: Study Design

Treatment Group

Pretest		Matific		Posttest
(Fall 2016 District Assessment)	→	Use	→	(Spring 2017 District Assessment)

Control Group

Pretest		No Matific		Posttest
(Fall 2016 District Assessment)	→	Use	→	(Spring 2017 District Assessment)
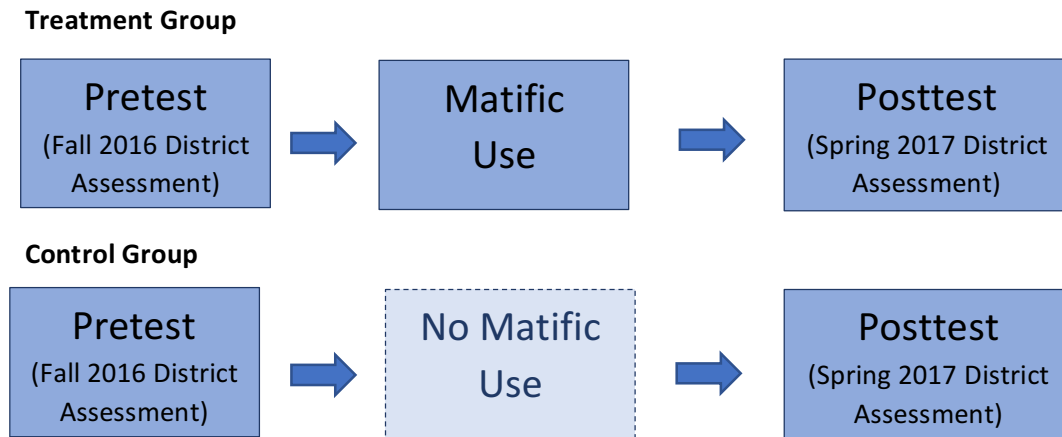
About the Treatment (Matific Product Use)

Matific is an instructional application designed to teach K to 6 math using hands-on and interactive mini-games, called episodes. An episode is a 5-15-minute game-oriented group of tasks designed to convey a specific mathematical concept, skill, or insight. Each episode is based on a modular and progressive spiral learning system. Matific uses real world scenarios that make math relatable and easy to understand and is mapped to common textbooks.

Progressing from fundamental math objectives to increasingly challenging activities, the Matific learning system encourages child self-discovery and internalization of mathematical insights and rules.
The Matific system monitors progress and provides periodic status reports at both the class and student level, as well as episodes, worksheets, playlists, lesson plans, episode guides, and resources.

Fidelity of Treatment

The fidelity with which the treatment is implemented as intended is important to establish. A central component of fidelity is the extent to which the product was used. While a class may nominally be designated as participating in the treatment group, it is important to verify that the product was actually used for instruction.

The Matific system identifies and reports the extent of use. SEG Measurement reviewed the use data to verify that those classes designated as treatment classes actually used the Matific application sufficiently to qualify as part of the final treatment group. Usage varied from 0 to 5915 episodes with an average number of episodes used of 928. Any class using fewer than 80 episodes was eliminated from the final analyses for this study to help ensure fidelity of use.

Instrumentation

The primary instrument used to compare the mathematic skills growth of students using Matific and those students was the District Based Assessment. The District Assessment for grades two and three contains twenty items aligned to the district curriculum and national standards. The assessment was developed by district math teachers through a multi-step, iterative process.

Hampton City Schools reported the scores on a 0-100 scale. These scores were used as a basis for the analyses included in the study and documented in this report.

Both the treatment and control group teachers completed surveys. The Treatment group survey collected background profile information as well as teacher perceptions of the Matific product. The control teacher survey was used primarily to characterize the sample of control group teacher participants.

Data Collection

Consistent with the study design, students in both the treatment and control group classes were administered the Hampton City District Assessment in the Fall of 2016 (Pretest). Treatment classes used Matific throughout the school year and classes in the control group followed traditional instructional practice. In the spring of 2017 students again were administered the Hampton City District Assessment (Posttest). Ina addition, both treatment and control teachers were invited to complete a survey of their perceptions of the effectiveness of Matific. The growth in mathematics skills for the treatment and control groups were compared and teacher perceptions were analyzed according to the analysis plan (see below).

Hampton City District and SEG Measurement worked together to develop the specifications for a data export that would include all of the necessary data points to conduct the study while protecting the identity of the participants. The district provided the de-identified District Assessment data for Fall 2016 and Spring 2017 for each student in the Treatment and Control Group classes.

The Matific online system was used to track the number of episodes used in each of the Treatment classes. This usage information was used to determine which classes and students were using Matific with fidelity during the school year.

Study Sample

Approximately 1477 grade two and three students enrolled in the Hampton City school district in Virginia participated in the study.   Approximately 666 students were in the treatment group (using Matific) and 811 were in the control group (not using Matific and following traditional practice). The actual number of students included in any given analysis varies. To be included in any given analysis a student was required to have taken both the pre-and posttest and treatment students were required to be in classes that used at least 80 episodes of Matific across the school year.

Student Grade Level

Of the approximately 1477 students participating in the study, approximately 666 students were in grade 2 classrooms and approximately 811 were in grade 3 classrooms that participated in the study.

Table 1: Study Sample: Total Group Student Grade Level

		Frequency	Percent	Cumulative Percent
Valid	2.0	658	.1	44.5
	3.0	819	.1	100.0
	Total	1477	.1	

Table 2: Study Sample: Student Grade Level by Study Group

Study Group	Grade	Frequency	Percent	Cumulative Percent
Treatment	Grade 2	229	34.4	34.4
	Grade 3	437	65.6	100.0
	Total	666	100.0	
Control	Grade 2	429	52.9	52.9
	Grade 3	382	47.1	100.0
	Total	811	100.0	

Student Gender

Overall, the number of male and female students participating in the study was equivalent. Roughly half of the participating students were male (50%; N=732) and half were female (50%; N=745).

Both the treatment and control groups were relatively equally split between girls and boys. The treatment group included 53% females and 47% males. The grade three control group was evenly split, with 49% of the group female and 51% male.

Table 3: Study Sample: Total Group Student Gender

	Frequency	Percent	Cumulative Percent
F	745	50.0	50.0
M	732	50.0	100.0
Total	1477	100.0	

Table 4: Study Sample: Student Gender by Study Group

Study Group	Gender	Frequency	Percent	Cumulative Percent
Treatment	F	350	52.6	52.6
	M	316	47.4	100.0
	Total	666	100.0	
Control	F	395	48.7	48.7
	M	416	51.3	100.0
	Total	811	100.0	

Student Ethnicity

Both the treatment and control groups included a diverse group of students with respect to ethnicity and were similar in distribution. More than half (54%) of the students participating were African American/Black. Another quarter (27%) of the students were Caucasian/White. About a tenth of the students were classified as multi-racial (9%) and about a tenth (9%) of the students were classified as Hispanic.

The largest group of participants were African American/Black in both the Treatment (67%) and Control Groups (43%). Caucasian/White was the second largest group in both the treatment group (19%) and the Control group (35%).

Table 5: Study Sample: Total Student Ethnicity

	Frequency	Percent
01-AmerIndian	4	<1%
02-Asian	17	1.0%
03-Black	791	54%
04-Hispanic	127	9%
05-White	406	27%
06-Hawaiian	1	<1%
07-Multi-Racial	131	9%
Total	1477	100%

Table 6: Study Sample: Student Ethnicity by Study Group

Study Group		Frequency	Percent
Treatment	02-Asian	3	.5
	03-Black	446	67.0
	04-Hispanic	40	6.0
	05-White	124	18.6
	06-Hawaiian	1	.2
	07-Multi-Racial	52	7.8
	Total	666	100.0
Control	01-AmerIndian	4	.5
	02-Asian	14	1.7
	03-Black	345	42.5
	04-Hispanic	87	10.7
	05-White	282	34.8
	07-Multi-Racial	79	9.7
	Total	811	100.0

Comparison of Initial Ability

It is important in a study such as this one that the groups be relatively equivalent in ability at the outset of the study to permit valid comparisons. While the Analysis of Covariance (ANCOVA) model used to compare mathematics growth for the study groups statistically adjusts for any initial differences in the ability of the treatment and control groups, the two groups must be similar enough at the outset to permit this adjustment. Conventionally, the two groups should be within about one half of one standard deviation of each other in initial ability. ANCOVA offers a comparison of the groups as if the two groups had the same initial ability (starting pretest score).

The Control Group was somewhat higher in initial ability than the treatment group (about 8 points). However, this difference reflects less than half of one standard deviation, permitting the statistical adjustment of pretest scores to eliminate the effects of initial differences

Table 6: Comparison of Treatment and Control Group Initial Ability (Pretest)

Study Group	Mean	N	Std. Deviation
Treatment Group	31.79	603	15.54
Control Group	39.73	739	21.12
Total	36.16	1342	19.22

Analysis and Results

Analysis

We analyzed the data to evaluate the difference in mathematics skills growth between students in classes using Matific and those in classes that did not use Matific.   We compared the Mathematics posttest results (dependent variable) for the treatment and control groups (independent variable) adjusted for the Mathematics pretest results (initial ability; covariate) using ANCOVA. This procedure was completed for the total group of students as well as separately for grades two and three.

We also examined whether Matific was more or less effective for male and female students and for students of different ethnicities.   We again used ANCOVA to compare the Mathematics posttest results (dependent variable) for the interaction between ethnicity and gender for the treatment and control groups (independent variables) adjusted for the Mathematics pretest results (initial ability; covariate) using ANCOVA.

Overall Results

Students in classes that used Matific showed significantly greater growth in mathematics skills than students in classes that did not use Matific ($F = 11.65$, $p < .01$). The effect size for the overall study sample was .19, or about a quarter (.19) of a standard deviation greater increase in math skill. On average students in the treatment group achieved a post test score of 77.23, 3.6 points more than students in the control group who achieved an average post test score of 73.67.   The analysis included 490 students in the treatment group and 566 in the control group, who had taken both the pre-and post-test. The results are summarized in Tables 7 and 8 below.

Table 7
Analysis of Covariance of the Treatment and Control Group Posttest Scores

Source	Type III Sum of Squares	df	Mean Square	F	Significance
Corrected Model	75835.689	2	37917.84	142.67	.01
Intercept	746941.04	1	746941.04	2810.42	.01
Pretest	75495.98	1	75495.98	284.06	.01
Study Group	3096.29	1	3096.29	11.65	.01
Error	279861.55	1053	265.78		
Total	6347108.00	1056			
Corrected Total	355697.24	1055			

]

Table 8: Descriptive Statistics Comparison of the Treatment and Control Group
Overall Posttest Scores (Adjusted for Pretest Performance)

Group	Number of Students	Posttest Scores	
		Mean	Standard Deviation
Treatment	490	77.23	18.01
Control	566	73.67	18.66
Total	1056	75.45	18.36

Grade Two Results

Students in grade 2 classes that used Matific showed significantly greater growth in mathematics skills than students in classes that did not use Matific (F =8.40, p < .01). The effect size for the overall study sample was .24 or about one quarter of a standard deviation greater increase in math skill. On average grade 2 students in the treatment group achieved a post test score of 81.06, 3.9 points more than students in the control group who achieved an average post test score of 77.15.   The analysis included 169 students in the treatment group and 325in the control group, who had taken both the pre-and post-test. The results are summarized in Tables 9 and 10 below.

Table 9
Analysis of Covariance of the Treatment and Control Group Grade 2 Posttest Scores

Source	Type III Sum of Squares	df	Mean Square	F	Significance
Corrected Model	42546.830[b]	2	21273.415	113.90	.01
Intercept	260685.569	1	260685.569	1395.69	.01
Pretest	42172.146	1	42172.146	225.79	.01
Study Group	1568.039	1	1568.039	8.40	.01
Error	91708.570	491	186.779		
Total	3177308.000	494			
Corrected Total	134255.401	493			

Table 10
Descriptive Statistics Comparison of the Treatment and Control Group
Grade 2 Posttest Scores (Adjusted for Pretest Performance)

Group	Number of Students	Posttest Scores	
		Mean	Standard Deviation
Treatment	169	81.06	15.67
Control	325	77.15	16.91
Total	494	80.38	16.50

Grade Three Results

Students in grade 3 classes that used Matific showed significantly greater growth in mathematics skills than students in classes that did not use Matific (F =2.67, p < .10). The effect size for the overall study sample was .13, or less than a quarter (.13) of a standard deviation greater increase in math skill. On average grade 2 students in the treatment group achieved a post test score of 73.63, 2.5 points more than students in the control group who achieved an average post test score of 71.10. The analysis included 321 students in the treatment group and 241 in the control group, who had taken both the pre- and post-test. The results are summarized in Tables 11 and 12 below.

Table 11
Analysis of Covariance of the Treatment and Control Group Grade 3 Posttest Scores

Source	Type III Sum of Squares	df	Mean Square	F	Significance
Corrected Model	26775.42	2	13387.71	40.37	.01
Intercept	261713.52	1	261713.52	789.15	.01
Pretest	26272.09	1	26272.09	79.22	.01
Study Group	885.34	1	885.34	2.67	.10
Error	185385.97	559	331.64		
Total	3169800.00	562			
Corrected Total	212161.39	561			

Table 12
Descriptive Statistics Comparison of the Treatment and Control Group
Grade 3 Posttest Scores (Adjusted for Pretest Performance)

Group	Number of Students	Posttest Scores	
		Mean	Standard Deviation
Treatment	321	73.63	19.02
Control	241	71.10	19.99
Total	562	72.36	19.45

Gender Analysis

There was no meaningful difference in the effectiveness of Matific between male and female students. The interaction between gender and Matific use was not significant. (F =1.58, p < .21). The analysis included 490 students in the treatment group and 566 in the control group, who had taken both the pre- and post-test and who were classified by gender in the data file. The results are summarized in Tables 13 and 14 below.

Table 13
Analysis of Covariance of the Treatment and Control Group by Gender
Posttest Scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	76284.93	4	19071.23	71.74	.01
Intercept	746340.42	1	746340.42	2807.33	.01
Pretest	75357.75	1	75357.75	283.46	.01
Study Group	3094.40	1	3094.40	11.64	.01
Gender	48.01	1	48.01	.18	.67
Study Group * Gender	419.05	1	419.05	1.58	.21
Error	279412.31	1051	265.85		
Total	6347108.00	1056			
Corrected Total	355697.24	1055			

Table 14
Descriptive Statistics Comparison of the Treatment and Control Group by Gender
Posttest Scores (Adjusted for Pretest Performance)

Group	Number of Students	Posttest Scores	
		Mean	Standard Deviation
Treatment Female	250	78.06	17.50
Treatment Male	240	76.37	18.54
Control Female	270	73.23	18.54
Control Male	296	74.07	18.77
Total	1056	75.43	18.36

Ethnicity Analysis

There was no meaningful difference in the effectiveness of Matific among students of different ethnicities. The interaction between ethnicity and Matific use was not significant. (F =1.01, p < .40). The analysis included 490 students in the treatment group and 566 in the control group, who had taken both the pre-and post-test and who were classified by ethnicity in the data file. The results are summarized in Tables 15 and 16 below.

Table 15
Analysis of Covariance of the Treatment and Control Group by Ethnicity
Posttest Scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	79223.25	11	7202.11	27.20	.01
Intercept	220612.08	1	220612.08	833.06	.01
Pretest	67110.28	1	67110.28	253.42	.01
Study Group	466.08	1	466.08	1.76	.19
Gender	2313.76	5	462.75	1.75	.12
Study Group * Ethnicity	1072.05	4	268.01	1.01	.40
Error	276473.99	1044	264.82		
Total	6347108.00	1056			
Corrected Total	355697.24	1055			

Table 16
Descriptive Statistics Comparison of the Treatment and Control Group by Ethnicity
Posttest Scores (Adjusted for Pretest Performance)

Group	Number of Students	Posttest Scores Mean	Standard Deviation
Treatment-Asian	2	90.16	.00
Treatment--Black	327	77.02	18.26
Treatment-Hispanic	28	80.31	13.29
Treatment--White	96	78.41	16.20
Treatment-Multi-Racial	37	72.16	21.31
Control-AmerIndian	3	65.13	34.03
Control-Asian	9	83.39	11.57
Control--Black	246	72.38	19.29
Control-Hispanic	56	74.49	16.99
Control--White	198	74.60	17.64
Control--Multi-Racial	54	74.71	17.98
Total	1056	76.62	18.36

Teacher Participant Back Ground

Number of teacher respondents. Twenty-seven control teachers responded to the survey. Twelve teachers in the treatment group responded to the survey.

Years of Experience. The treatment and control group teachers reported a similar level of experience teaching. About a quarter of both groups (treatment=23%; control=25%) indicated that this was their first-year teaching. Both groups had about a quarter (treatment=26%; control=25%) of the teachers indicating that they had taught 21 or more years.

Highest Degree Earned. While similar in degree level, the control group teachers were more likely to hold advanced degrees as compared to the treatment. Nearly half (48%) of the control group teachers held an advanced degree, while a third (33.3%) of the treatment group teachers held an advanced degree.

Table 17: Teacher Years of Experience				
	Control		**Treatment**	
	Frequency	Percent	Frequency	Percent
This is my first year	5	23.2	3	25.0
6 to 10 years	7	25.9	1	8.3
11 to 15 years	3	11.1	4	33.3
16 to 20 years	4	14.8	1	8.3
21 or more years	7	25.9	3	25.0
Total	27	100.0	12	100.0

Table 18: Teacher Highest Degree Earned				
	Control		**Treatment**	
	Frequency	Percent	Frequency	Percent
Bachelor's	14	51.9	8	66.7
Master's	12	44.4	4	33.3
Ph.D. or Ed.D. or Ed.S.	1	3.7	0	0
Total	27	100.0	12	100.0

Teacher Perceptions of Efficacy (Treatment Group Teachers)

Teachers who used Matific in their classrooms were asked a series of questions about their use of Matific and their perceptions of the Matific program.

Implementation and Usage

About two thirds (64%) of the teachers responding to the survey indicated that they used Matific with a mixture of individual and whole class instruction. The remaining teachers were equally split between individual student and whole class use.

About half (46%) of the responding teachers indicated that they used Matific between 1 hour and 90 minutes per week. Another quarter (27%) reported using Matific between ½ hour to 1 hour per week and about a quarter (18%) reported using the product between 90 minutes and two hours per week.

Table 19: How did you implement Matific in your classroom?		Frequency	Percent
	Individual students	2	18.2
	Mixture of individual, group, and whole class	7	63.6
	Small groups	2	18.2
	Total	11	100.0

Table 20: About how many hours per week on average did your students use Matific?		Frequency	Percent
	1 hour to less than 90 minutes per week	5	45.5
	½ hour to less than 1 hour per week	3	27.3
	90 minutes to less than 2 hours per week	2	18.2
	More than 2 hours per week	1	9.1
	Total	11	100.0

Table 21: Purpose		Percent of Teachers indicating they use Matific for this purpose
	To help struggling students	82%
	To challenge students	64%
	To give students individual time for additional math practice	100%
	To prepare for an assessment	82%
	To introduce a new math skill	73%

	To reinforce what I am teaching in class	91%
	To help make math fun	91%
	To allow students to work at their own pace	55%
	Students can select Matific as a free time activity	46%

Teachers were asked to indicate whether or not they used each component in the Matific program and the extent to which they felt each of the Matific program components was effective. For each component, the table below indicates the percentage of teachers indicating that each Matific component was effective or very effective.

The core component of the Matific program is the instructional episodes. Nearly all (91%) of the teachers indicated that they used the episodes and of those nearly all (90%) saw them as effective. The remaining support components, with the exception of the playlists were not frequently used. The playlists were used by 73% of the responding teachers, of whom nearly all (88%) felt the playlists were effective.

Table 22: Component		Did you use this component?	Percent of teachers indicating they that this Matific component was effective or very effective
	Episodes	91%	90%
	Worksheets	45%	60%
	Playlists	73%	88%
	Lesson Plans	27%	66%
	Teacher Guides	36%	75%

Table 23: Efficacy Statement	Percent of teachers indicating they agree or strongly agree with the efficacy statement
Matific is an important part of my math instruction.	73%
It was easy to find everything I needed.	91%
The episodes are of high quality.	73%
It was easy to assign activities to students.	91%
There were activities appropriate for students performing on grade level.	91%
There were activities appropriate for students performing below grade level.	82%
There were activities appropriate for students performing above grade level.	100%
The activities were well aligned to common core standards.	55%
The activities were well aligned to our district's curriculum.	73%
The reporting and analytics were helpful.	73%
I was able to easily identify who needed extra assistance or practice.	91%
The students are engaged when using Matific.	73%
The students enjoy using Matific.	100%
The students are challenged by Matific.	91%
Matific has helped my students learn how to solve challenging problems.	73%
Matific has helped my students gain a deeper understanding of what we are learning in class.	82%
Matific has helped my students become better critical thinkers.	64%
Matific has increased my students interest in math.	73%

Matific helped to make connections between classroom learning and the real world.	64%
The rewards and trophies were motivating to my students.	73%
My students benefited from using Matific.	91%

Effectiveness by Domain

Teachers were asked to indicate whether they used Matific to provide instruction in each of several content domains. For each domain that teachers indicated they used Matific for instruction, they were asked the extent to which they felt that Matific was effective. For each domain, the table below indicates the percentage of teachers indicating that they felt that Matific was effective or very effective for that domain.

Table 24: Domain	Did you use this Matific for instruction in this domain?	Percent of teachers indicating they that Matific was effective or very effective for this domain
Operations and Algebraic Thinking	78%	71%
Number and Operations in Base 10	89%	75%
Number and Operations: Fractions	67%	100%
Measurement and Data	89%	63%
Geometry	77%	57%

Home Use

Participating teachers were asked whether students used Matific at home. One third (33%) indicated that students did use Matific at home, about half (44%) indicated they did not know whether students used the product at home, and about a quarter (22%) said that students did not use the product at home.

Future Plans to Use and Recommend Matific

Most teachers reported plans to use Matific in the future and recommend Matific to other teachers. About four out of five (78%) of the teachers who used Matific in the study indicated that they are likely to use Matific in the future and nearly all (89%) indicated that they would recommend Matific to other teachers.

Summary and Conclusion

During the 2016-2017 school year, SEG Measurement conducted a year-long study to evaluate the effectiveness of Matific, an instructional application designed to teach K to 6 math. Approximately 1477 grade two and three students enrolled in the Hampton City school district in Virginia participated in the study.

The study compared the growth in mathematics skills for students in classes using the Matific program (treatment group) and those in comparable classes following traditional instructional practice without using Matific (control group) using a quasi-experimental design. Students in both the treatment and control group were administered a pretest of mathematic skills in the fall of 2016 and a posttest in the Spring of 2017. The treatment group classes instructed students using Matific, while the control group instructed students using traditional instructional practice. Students in both groups then completed a posttest of mathematic skills.

The mathematics growth for Matific users and non-users was compared statistically using Analysis of Covariance (ANCOVA). Specifically, we examined the difference in the Spring 2017 scores (dependent variable) between the treatment and control groups (independent variable) while controlling for the initial ability of the students from fall 2016 (covariate). Students in classes using the Matific program improved their math skills significantly more than students in classes receiving instruction without Matific. The overall effect size was .19, the effect size for grade two was .24 and the effect size for grade three was .13. There was no difference in Matific effectiveness among students of different genders and ethnicities.

Most teachers reported plans to use Matific in the future and recommend Matific to other teachers. About four out of five (78%) of the teachers who used Matific in the study indicated that they are likely to use Matific in the future and nearly all (89%) indicated that they would recommend Matific to other teachers.

Conclusion

Students in classes using the Matific program improved their math skills significantly more than students in classes receiving instruction without Matific. The results support the effectiveness of Matific use in improving grade two and three students' math skills.

Appendix A

Participating Schools

School	Number of Classes	Study Group
Andrews	1	Treatment
Bassette	1	Treatment
Booker	1	Treatment
Cooper	2	Treatment
Machen	3	Treatment
Simpson	1	Treatment
Tyler	2	Treatment
Armstrong	3	Control
Bryan	4	Control
Langley	5	Control
Phenix	5	Control
Phillips	2	Control
Smith	3	Control
Tucker Capps	5	Control