

The effect of using Renzulli Learning on student achievement: An investigation of Internet technology on reading fluency, comprehension, science, and social studies

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Despite some research that links technology and educational attainment in U.S. classrooms (Azzam, 2006; Coiro, 2003; Mann & Shafer, 1997; Jennings & Lucca, 2005), little research exists about whether the use of Internet technology can increase reading fluency and comprehension. This quantitative study explored the use of a new Internet-based program, Renzulli Learning, to increase student achievement, specifically in reading fluency and comprehension. This interactive on-line program matches student interests, learning styles, and expression styles with a vast array of educational activities and resources designed to enrich students' learning process. In this study, students using Renzulli Learning were provided with opportunities to explore, discover, learn, and create using the most current technology resources in a safe environment. Many students spend hours reading independently on the Internet while using Renzulli Learning on a weekly basis, and this study was conducted to explore whether the use of this on-line system can increase reading fluency and comprehension.

Related Research

According to the National Report on NetDay's third annual "Speak Up" survey (2005) with over 185,000 student respondents from all 50 states, students who use the Internet as a resource at home are frustrated because they can not use technology how, when, and where they would like to in school. Major findings from the National NetDay survey (2005) entitled, *Our voices, our future: Student and teacher views on science, technology &*

education, found that teachers and students believe there is a need to gain access to up-to-date technology tools at school when students need them. This survey also found that students are strong believers in the power of technology to enrich their learning experiences (http://www.netday.org/speakup_2005.htm).

Other research has demonstrated the power of technology and its influence on student learning (Bain & Ross, 1999; Cradler & Cradler, 1999). In one eight-year longitudinal study, for example, Bain and Ross (1999) found that careful alignment between content-area learning standards and carefully selected technology can significantly increase student achievement scores. Cradler and Cradler (1999) reported that teachers observed significant changes in their students' skills and knowledge acquisition upon completion of their first multi-media project. In a follow-up study, "teachers reported increased student knowledge in: research skills; ability to apply learning toward real-world situations; organizational skills; and interest in content" (Cradler, McNabb, Freeman, & Burchett, 2002, p. 47). Siegle and Foster (2001) also found that student achievement increased in science when students created multimedia projects illustrating the concepts they were learning in school.

No research, until now, has linked Internet technology to significantly different scores in students' reading fluency and comprehension. According to Pikulski and Chard (2005), reading fluency and reading comprehension scores were correlated after the National Assessment of Educational Progress in Reading conducted a large-scale data analysis of the two reading assessments. "In that study, 44% of the subjects were not fluent when reading grade-level appropriate materials; the study also showed a significant, positive relationship between oral reading fluency and reading comprehension" (Pikulski & Chard, 2005, p. 510). In a previous study conducted by researchers at the National Research Center on the Gifted

and Talented, the correlation between reading fluency and comprehension was found to be quite high (Reis et al., 2005).

This study focused on increasing reading achievement, as well as academic achievement in both science and social studies for elementary and middle school students using Renzulli Learning. Students' attitudes toward reading, learning, and school were investigated using pre and post assessments that will be described in a later section.

Background of the Study

The question of how technology can increase and enhance learning is a growing area of educational research in the United States. Some researchers have investigated teachers' perceptions of self-efficacy in relation to their technology usage (Hogarty, Lang, & Kromrey, 2003; National Center for Education Statistic, 1999, 2000), perceived benefits for students who use technology, (Azzam, 2006; Coiro, 2003; Mann & Shafer, 1997) and perceived benefits among teachers who use technology in the classroom (Leu, Leu, & Coiro, 2004; ASCD, 2005). This study of how a new Internet-based program, Renzulli Learning (RL), affects students' reading fluency and comprehension will contribute to the body of research exploring technology usage in U.S. classrooms.

Renzulli Learning is an electronic search-engine and profiler that matches students' perceived interests, abilities, learning styles, and expression styles to thousands of enrichment activities. Using Renzulli Learning may help to increase the number of students in middle school whose reading fluency scores generally fail to improve over their middle school grades. According to Armbruster (2002), "Oral reading fluency is the ability to read with accuracy, and with an appropriate rate, expression, and phrasing." Reading fluency scores have flattened as students get older, and according to Rasinski (2006), "Target reading

rate norms suggest that reading rates tend to increase through the middle grades; however, the rate of acceleration diminishes after sixth grade” (p. 2). This finding is verified in the most recent national oral reading fluency norms established by Hasbrouck & Tindal (2005).

Renzulli Learning is based on The Enrichment Triad Model (Renzulli, 1977) and the Schoolwide Enrichment Model (SEM) developed by Renzulli and Reis (1985, 1997), representing over 30 years of research conducted at the University of Connecticut’s Neag School of Education. The SEM is recognized as one of the most widely used plans for enrichment and talent development in the world. Renzulli and Reis (1997) define the SEM as, “a systematic set of specific strategies for increasing student effort, enjoyment, and performance, and for integrating a broad range of advanced level learning experiences and higher order thinking skills into any curricular area, course of study, or pattern of school organization” (p. 20). Some educators believe that this type of enrichment could be provided to all students through using the Renzulli Learning. In its original paper-based format, the SEM instruments that are now a part of Renzulli Learning have been field tested for over 20 years in thousands of schools. Currently, RL is being used in over 1,400 schools in 43 states.

Research Questions

The purpose of this study was to investigate differences in students’ reading fluency, reading comprehension, science achievement, and social studies achievement, as well as attitudes about reading and school between treatment and control conditions (using or not using RL) on pre and post tests. The following research questions were addressed in this study using quantitative analyses:

- 1.) Is there a significant difference from pre-test oral reading fluency scores to post-

test oral reading fluency scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?

2.) Is there a significant difference from pre-ITBS reading comprehension scores to post-ITBS reading comprehension scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?

3.) Is there a significant difference from pre-ITBS science achievement scores to post-ITBS science achievement scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?

4.) Is there a significant difference from pre-ITBS social studies achievement scores to post-ITBS social studies achievement scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?

Methods and Procedures

Quantitative procedures were used to investigate the use of Renzulli Learning on reading fluency, comprehension, science, and social studies achievement in two schools, an urban middle school where a majority of students are placed at risk due to poverty or other factors, and a suburban elementary school in a middle class neighborhood. The sample included 383 students ($n = 203$ males; $n = 180$ females) from both schools with administrators who agreed to have students and teachers voluntarily participate in the study. An experimental design was used with random assignment of students to treatment and control groups, and recommended follow-up quantitative procedures of repeated-measures analysis of variance (ANOVA) were used to explore specific group differences.

Sample

The two schools received the school Superintendent's approval, and the administration and faculty at both sites agreed to participate in this study. One of the schools selected for this study was an urban middle school in Atlanta, GA, in which students who received the Renzulli Learning treatment in 6th, 7th, and 8th grades ($n = 106$) met for 16 weeks for approximately 2-3 hours each school week to use Renzulli Learning in heterogeneously mixed technology classes. Students at the Inman site were randomly selected, and all were taught by the technology teacher. Control students in grades 6 - 8 ($n = 92$) at Inman Middle School did not have access to Renzulli Learning for the same 16-week period, but were given access to the system after the intervention.

The second research site was an elementary school in Oak Park, CA where treatment groups in 3rd, 4th, and 5th grades ($n = 96$) will met for 16 weeks for approximately 3 hours each school week in heterogeneously mixed classrooms. Both teachers and students at Oak Hills Elementary were randomly selected to participate in treatment and control groups in the study. Control groups in 3rd, 4th, and 5th grades ($n = 89$) at Oak Hills did not have access to Renzulli Learning for the same 16-week period, but also had access to the system after the intervention.

Recruitment of students for the study was completed the year before implementation. Several meetings were conducted with principals and superintendents from various school districts in professional development partnerships with the university researchers describing the study between the fall of 2005 to the winter of 2006. Subsequent discussions were held with interested principals about study participation and the need for random assignment to treatment and control groups, as well as a minimum of 16 weeks for the intervention. Two principals made a commitment to participate, schedules were arranged, and all students (and

teachers at Oak Hills Elementary) were randomly assigned to treatment or control groups after IRB approval was received. The principal in both schools identified a research liaison to facilitate the implementation of the study, and professional development sessions for the treatment teachers were delivered in the summer of 2006. The ethnic distribution of students at each school and across each state, as well as the sample for the study are summarized in Table 1 and Table 2.

Table 1

Ethnic Distribution of Students at the Middle School, at the State Level, and in the RL Treatment Group

Ethnicity	Middle School research site	State - GA	RL Treatment
African-American	55%	38%	50%
Asian	1%	3%	2%
Caucasian	38%	49%	40%
Hispanic	2%	8%	5%
Multi-racial	3%	2%	3%

Table 2

Ethnic Distribution of Students at the Elementary School, at the State Level, and in the RL Treatment Group

Ethnicity	Elementary School research site	State - CA	RL Study
African-American	3%	8%	0%
Asian	15%	8%	8%
Caucasian	76%	30%	75%
Hispanic	4%	48%	3%
Multi-racial	< 1%	2%	3%
Other	3%	2%	6%

Instrumentation

The following instruments were used for pre and post assessments with both treatment and control students in this study.

Oral Reading Fluency Assessments

Curriculum-based measures of oral reading fluency were individually administered as a pre- and post-test to assess students' speed and accuracy when reading connected text (Deno, 1989). Because oral reading fluency reflects the complex orchestration of both lower-level and higher-level processes, it can be considered an elegant and a reliable indicator of overall reading proficiency (Fuchs, Fuchs, Hosp, & Jenkins, 2001). To measure oral reading fluency, each student read an unpracticed grade level passage of connected text for 1 minute. The score is the number of words read correctly. Test-retest and alternate-form reliability of oral reading fluency measures are consistently above .90 and criterion-related validity with other standardized measures of reading decoding and comprehension average .80 or higher (Hasbrouck & Tindal, 1992).

Iowa Tests of Basic Skills

Reading comprehension, science achievement, and social studies achievement were measured using the *Iowa Tests of Basic Skills (ITBS)* subtests from each subject area (Form A, 2001). The *ITBS* measures achievement in 15 subject areas for students in grades K-8, and the three subject areas of reading comprehension, science, and social studies were administered at grade-level to all students in the study in grades 3 – 8 in both treatment and control groups. The Reading Comprehension subtests of the *ITBS*, which are administered in two parts, measure how students derive meaning from their reading (Hoover et al., 2001). The Social Studies subtests assesses students' understanding of history, geography, economics, and government through a variety of concepts, principles, and selected visual illustrations (Hoover et al., 2001).

Renzulli Learning Intervention

The Renzulli Learning Profiler is an on-line questionnaire about students' interests, abilities, learning styles, and modes of expression that takes between thirty minutes and one hour to complete. Students in the experimental group at both schools registered to use Renzulli Learning and began using the program in their heterogeneously mixed and randomly assigned classes between 2 – 3 hours per week for 16 weeks.















After the Profiler was completed, students had access to their own Enrichment Database on Renzulli Learning, including the following activities and resources: virtual field trips; real field trips; creativity training; projects & independent study; contests & competitions; websites; fiction books & e-books; non-fiction books & e-books; how-to books & e-books; summer programs; on-line activities & classes; research sites; and videos & dvds. See Figure 1 below for an illustration of The Enrichment Activities Database:

Figure 1

MY ENRICHMENT ACTIVITIES: [Search Enrichment Activities](#)

Here are some enrichment activities that might interest you. Click any of the icons below to view the activities:

Check this box to view your favorites and your teacher favorites only!

 virtual field trips 170 Activities	 real field trips 216 Activities	 creativity training 234 Activities	 critical thinking 153 Activities	 projects & independent study 175 Activities	 contests & competitions 41 Activities	 websites 958 Activities
 fiction (books & e-books) 103 Activities	 non-fiction (books & e-books) 185 Activities	 how-to (books & e-books) 66 Activities	 summer programs 28 Activities	 on-line activities & classes 131 Activities	 research sites 724 Activities	 videos & dvds 102 Activities

A 16-week Overview for Program Implementation is summarized in Table 3, which was provided to help the treatment teachers incorporate RL into their classroom pedagogy:

Table 3

Renzulli Learning 16-week Program Implementation Overview

Week	Day 1	Day 2	Day 3
1	Student Registration	Renzulli Profiler	Profiler & Explore
2	Guided lesson/ Enrichment Activities Exploration	Mini-lesson; website descriptions	Evaluation of sites; Cornell article
3	Website critiques	In-class presentation of Website critiques	Resource description log
4	Self-assessment/ Resource description log	Self-assessment/ Description log	Begin answering Open-ended questions
5	Exploration/ Open-ended questions	Exploration Open-ended questions	Completion of Open-ended questions
6	Teacher pushes-in favorites to Student Portfolio	Teacher pushes-in favorites to Portfolio	Teacher pushes-in favorites to Portfolio
7	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum
8	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum
9	Wizard Project Maker(WPM) Super Starter Projects (SSP)	WPM/ SSP	WPM/SSP
10	WPM/Super Starter Projects	WPM/SSP	WPM/SSP
11	WPM/Super Starter Projects	WPM/SSP	WPM/SSP
12	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum
13	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum	Push-in favorites supporting the regular curriculum
14	Portfolio - Notes	Portfolio - Notes	Portfolio - Notes
15	WPM / Research/ (IBE) Interest-based Enrichment	WPM / Research (IBE)	WPM / Research (IBE)
16	WPM / Research Interest-based Enrichment	WPM / Research (IBE)	WPM / Research (IBE)

The Wizard Project Maker helps teachers guide students through the research process by providing them with an organizational framework and storage portfolio for easy access to these resources. Enrichment learning includes investigative activities and the development of creative products in which students become practicing professionals as first-hand investigators, writers, artists, or other junior professionals throughout the production of a product or service.

In this study, the teacher's role changed from the traditional model where the teacher planned and prescribed what is to be learned, to a more supportive, reactive person who facilitates enrichment learning. Renzulli (1977; Renzulli & Reis, 1997) described the teacher's new role as the "guide-on-the-side" by approaching the teaching/learning interaction from the perspective of a coach or mentor rather than the teacher who "fills" the student with knowledge. The basic characteristics of enrichment learning include:

- Selection of a topic that may be related to the regular curriculum or an independent topic based on the student's interest
- Student production of a product and/or service that is intended to have an impact on a particular audience
- Use of authentic methods, technological resources, and advanced level content by a student to produce a product or service.

Data Analysis

The quantitative analysis was completed using repeated-measures ANOVA procedures. For research question 1, the between variables were students using Renzulli Learning (treatment) and students not using Renzulli Learning (control). The repeated measures were the students' oral reading fluency pre-tests and post-tests. For research question 2, the between variables were students using Renzulli Learning (treatment) and

students not using Renzulli Learning (control). The repeated measures were the students' *ITBS* reading comprehension pre-tests and post-tests. For research question 3, the between variables were students using Renzulli Learning (treatment) and students not using Renzulli Learning (control). The repeated measures were the students' *ITBS* science pre-tests and post-tests. For research question 4, the between variables were students using Renzulli Learning (treatment) and students not using Renzulli Learning (control). The repeated measures were the students' *ITBS* social studies pre-tests and post-tests. Significant differences in reading fluency, reading comprehension, science, and social studies achievement were examined between treatment and control groups by looking at growth over the 16-week intervention.

Results

A two-way repeated-measures ANOVA was used to explore differences between treatment and control students. After only 16 weeks, students who participated in Renzulli Learning demonstrated significantly higher growth in reading comprehension ($p < .001$), significantly higher growth in oral reading fluency ($p = .016$), and significantly higher growth in social studies achievement ($p = .013$) than those students who did not participate in Renzulli Learning. No differences were found for science achievement ($p = .055$).

Research Question One

Is there a significant difference from pre-test oral reading fluency scores to post-test oral reading fluency scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?

The multivariate tests indicate a significant difference between pre-test oral reading fluency scores and post-test oral reading fluency scores for students who participated in Renzulli Learning and control students who did not participate in Renzulli Learning, Wilks' $\Lambda = .984$, $F(1, 373) = 5.91$, $p = .016$, partial $\eta^2 = .02$. Students who participated in the Renzulli Learning treatment demonstrated significantly higher growth in oral reading fluency than those students who did not participate in Renzulli Learning.

A summary of the group means and standard deviations of oral reading fluency scores for the control and treatment groups are shown in Table 4; the main effects and interaction effects on oral reading fluency for the two-way repeated measures ANOVA are presented in Table 5; and the difference between pre and post oral reading fluency (ORF) by group for all students is illustrated in Figure 2.

Table 4

Oral Reading Fluency Mean Scores by Groups

		Pre-test			Post-test		
		<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Control	Not Gifted	131	135.95	35.52	131	149.74	33.42
	Gifted	50	180.49	31.74	50	191.51	26.88
	Total	181	148.21	39.80	181	161.24	36.79
Treatment	Not Gifted	147	129.98	39.09	147	147.84	38.38
	Gifted	55	183.04	27.25	55	198.26	26.92
	Total	202	144.11	43.21	202	161.27	42.05
Total	Not Gifted	278	132.78	37.51	278	148.73	36.08
	Gifted	105	181.81	29.38	105	195.02	26.98
	Total	383	146.05	41.63	383	161.25	39.60

Table 5

ANOVA for Main Effects and Interaction Effects on Oral Reading Fluency

Variable	<i>df</i>	<i>MS</i>	<i>F</i>	η^2
Time	1	31104.72	289.38**	.44
Time * Treatment	1	634.94	5.91*	.02
Time * Gifted	1	270.62	2.52	.01
Time * Treatment * Gifted	1	0.18	0.00	.00
Error(Time)	373	107.49		

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

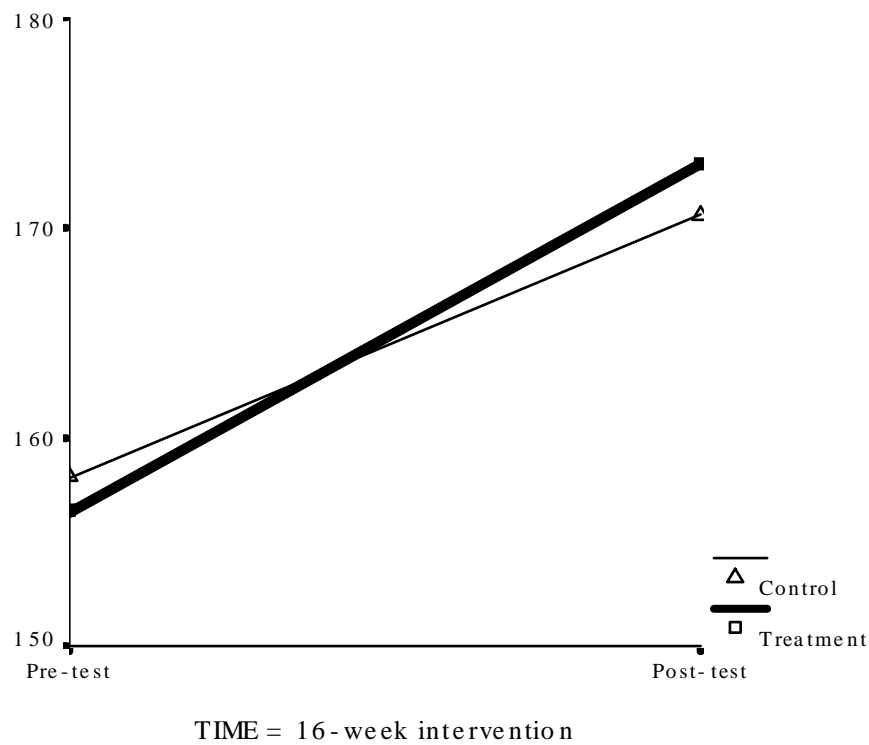


Figure 2. Difference between pre and post ORF by group for all students

Research Question Two

Is there a significant difference from pre-ITBS reading comprehension scores to post-ITBS reading comprehension scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?

The multivariate tests indicate a significant difference between pre-ITBS reading comprehension scores and post-ITBS reading comprehension scores between students who participated in Renzulli Learning and students who did not participate in Renzulli Learning, Wilks' $\Lambda = .953$, $F(1, 379) = 18.58$, $p < .001$, partial $\eta^2 = .05$. Students who participated in the Renzulli Learning intervention demonstrated significantly higher growth in reading comprehension than those students who did not participate in Renzulli Learning.

A summary of the group means and standard deviations of ITBS reading comprehension standardized scores for the control and treatment groups are shown in Table 7; the main effects and interaction effects on reading comprehension for the two-way repeated measures ANOVA are presented in Table 8; and the difference between pre and post ITBS reading comprehension standardized scores by group for all students is illustrated in Figure 3.

Table 7

ITBS Reading Comprehension Standardized Mean Scores by Groups

		Pre-test			Post-test		
		<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Control	Not Gifted	131	223.33	32.62	131	231.44	30.66
	Gifted	50	273.14	31.26	50	276.00	30.63
	Total	181	237.09	39.16	181	243.75	36.52
Treatment	Not Gifted	147	207.07	30.76	147	224.33	31.81
	Gifted	55	272.62	26.98	55	287.00	29.13
	Total	202	224.92	41.69	202	241.39	41.77
Total	Not Gifted	278	214.73	32.62	278	227.68	31.42
	Gifted	105	272.87	28.95	105	281.76	30.22
	Total	383	230.67	40.92	383	242.50	39.34

Table 8

ANOVA for Main Effects and Interaction Effects on Reading Comprehension

Variable	<i>df</i>	<i>MS</i>	<i>F</i>	η^2
Time	1	17250.45	78.90*	.17
Time * Treatment	1	4061.26	18.58*	.05
Time * Gifted	1	627.09	2.87	.01
Time * Treatment * Gifted	1	53.38	0.24	.00
Error(Time)	379	218.63		

* $p < .01$.

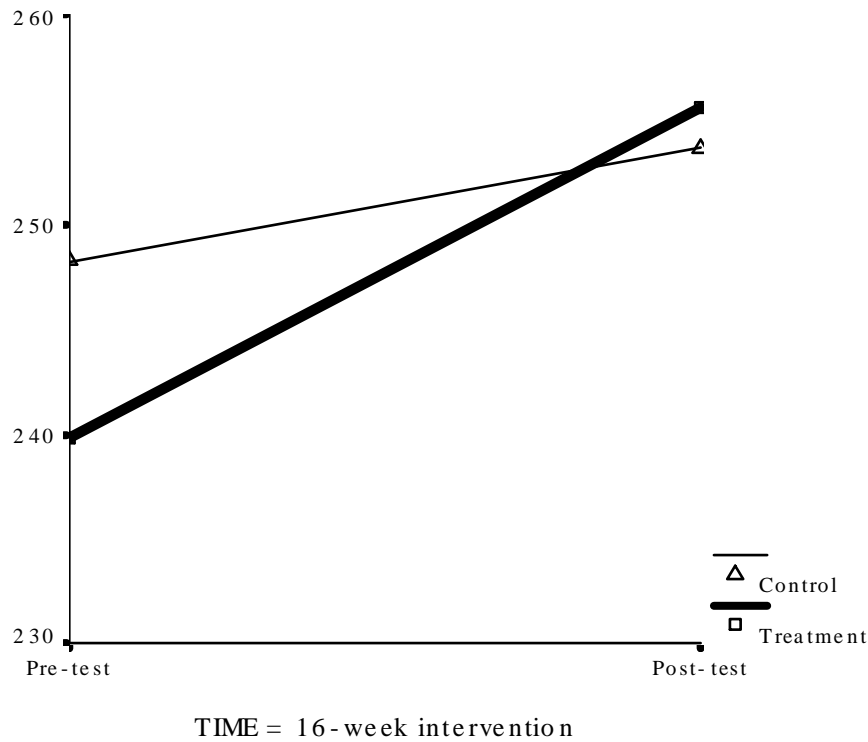


Figure 3. Difference between pre and post ITBS RC by group for all students

Research Question Three

3.) *Is there a significant interaction from pre-ITBS science achievement scores to post-ITBS science achievement scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?*

The multivariate tests indicate no significant interaction between pre-ITBS science achievement scores and post-ITBS science achievement scores between students who participated in Renzulli Learning and students who did not participate in Renzulli Learning, Wilks' $\Lambda = .990$, $F(1, 375) = 3.70$, $p = .055$, partial $\eta^2 = .01$. Students who participated in

Renzulli Learning did not demonstrate greater growth in science achievement than those students who did not participate in Renzulli Learning.

A summary of the group means and standard deviations of ITBS science standardized scores for the control and treatment groups are shown in Table 9; and the main effects and interaction effects on science achievement for the two-way repeated measures ANOVA are presented in Table 10.

Table 9

ITBS Science Achievement Standardized Mean Scores by Groups

		Pre-test			Post-test		
		<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Control	Not Gifted	131	224.29	29.37	131	238.02	32.17
	Gifted	50	272.76	38.10	50	285.92	31.46
	Total	181	237.90	38.70	181	251.47	38.50
Treatment	Not Gifted	147	212.82	35.18	147	231.9	37.29
	Gifted	55	277.22	29.30	55	295.93	29.73
	Total	202	230.44	44.24	202	249.42	45.45
Total	Not Gifted	278	218.18	33.04	278	234.76	35.06
	Gifted	105	275.10	33.69	105	291.16	30.83
	Total	383	233.95	41.84	383	250.38	42.29

Table 10

ANOVA for main effects and interaction effects on science achievement

Variable	<i>df</i>	<i>MS</i>	<i>F</i>	η^2
Time	1	39572.77	130.14*	.26
Time * Treatment	1	1123.73	3.70	.01
Time * Gifted	1	8.23	0.03	.00
Time * Treatment * Gifted	1	0.38	0.00	.00
Error(Time)	375	304.07		

* $p < .001$.

Research Question Four

4.) Is there a significant interaction from pre-ITBS social studies achievement scores to post-ITBS social studies achievement scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning?

The multivariate tests indicate a significant interaction between pre-ITBS social studies achievement scores and post-ITBS social studies achievement scores for students who participated in Renzulli Learning and students who did not participate in Renzulli Learning, Wilks' $\Lambda = .983$, $F(1, 371) = 6.28$, $p = .013$, partial $\eta^2 = .02$. Students who participated in Renzulli Learning demonstrated significantly higher growth in social studies achievement than those students who did not participate in Renzulli Learning.

A summary of the group means and standard deviations of ITBS social studies standardized scores for the control and treatment groups are shown in Table 11; the main effects and interaction effects on social studies achievement for the two-way repeated measures ANOVA are presented in Table 12; and the difference between pre and post ITBS social studies standardized scores by group for all students is illustrated in Figure 4.

Table 11

ITBS Social Studies Achievement Standardized Mean Scores by Groups

		Pre-test			Post-test		
		<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Control	Not Gifted	131	218.71	29.96	131	228.19	32.01
	Gifted	50	269.20	38.87	50	278.82	39.65
	Total	181	232.69	39.66	181	242.20	41.04
Treatment	Not Gifted	147	210.06	28.01	147	223.98	32.91
	Gifted	55	267.57	34.79	55	286.70	31.32
	Total	202	225.45	39.30	202	240.77	42.73
Total	Not Gifted	278	214.12	29.21	278	225.95	32.50
	Gifted	105	268.35	36.64	105	282.91	35.61
	Total	383	228.87	39.58	383	241.45	41.89

Table 12

ANOVA for Main Effects and Interaction Effects on Social Studies Achievement

Variable	<i>df</i>	<i>MS</i>	<i>F</i>	η^2
Time	1	25177.15	87.56**	.19
Time * Treatment	1	1805.09	6.28*	.02
Time * Gifted	1	265.15	0.92	.00
Time * Treatment * Gifted	1	238.93	0.83	.00
Error(Time)	371	287.55		

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

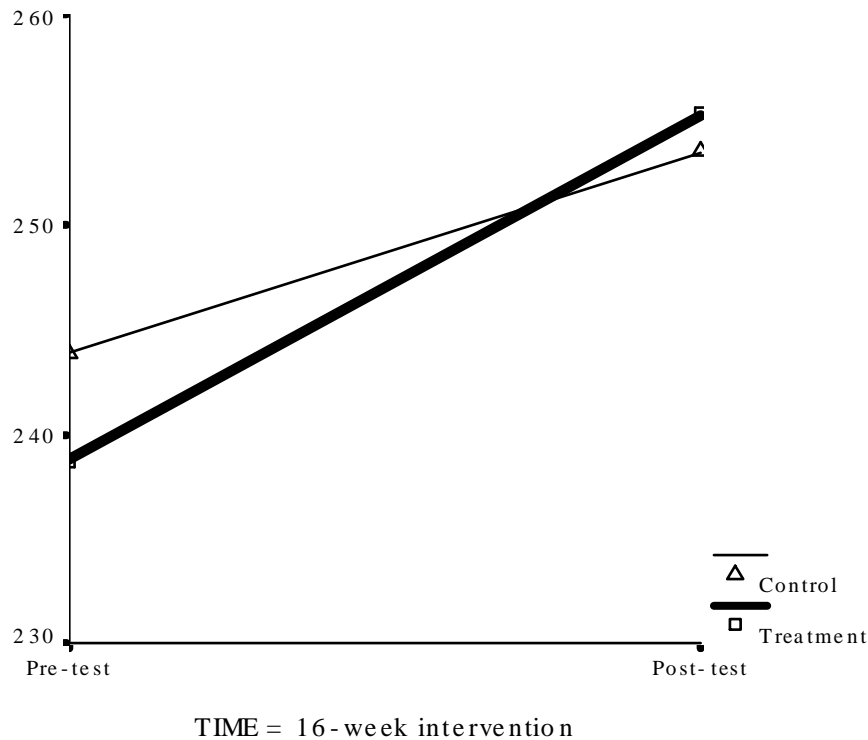


Figure 4. Difference between pre and post ITBS SS by group for all students

Conclusion

It is important to recognize the role technology plays in the lives of students in elementary and middle school grades. In *The Road Ahead*, Bill Gates (1995) wrote, “One thing is clear. We don’t have the option of turning away from the future. No one gets to vote on whether technology is going to change our lives” (p. 11). Gates was correct, for technology has changed the lives of children (in and out of school), and it is the responsibility of researchers to explore the relationship between technology and student achievement.

Renzulli Learning has the potential to increase student achievement in terms of reading fluency and reading comprehension. If students are reading what they enjoy and are

engaged and motivated to do so, one may conclude that achievement gains in reading will occur. In a survey of over 1,700 sixth graders conducted by Ivey and Broaddus (2001) research indicated that good reading materials were the greatest factor in determining student motivation to read in school. Yet a disparity exists in what students preferred to read and what was made available for them to read in school. Ivey and Broaddus (2001) believe that students' in-school reading was extremely narrow in scope while their out of school reading covered a variety of genres, thus hindering their motivation to read in school.

Renzulli Learning offers a wide variety of resources to choose from based on their interests, learning styles, and expression styles. Thus, the more a student reads, the more his or her reading will improve. This study is an important first step to exploring the role of this new Internet-based technology program, Renzulli Learning, in relation to student achievement.

References

- Armbruster, B.B. (2002, October). *Research-based instruction in reading*. Student Achievement and School Accountability Conference, Washington, DC. Retrieved September 18, 2006, from <http://www.ed.gov/admins/lead/read/rb/edlite-slide016.html>
- Azzam, A. M. (2006). Digital opportunity. *Educational Leadership*, 63(4), 89-92.
- Bain, A., & Ross, K. (1999). School reengineering and SAT-I performance: A case Study. *International Journal of Education Reform*, 9, 148-153.
- Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56, 458-464.
- Cradler, J., & Cradler, R. (1999). *Just in time: A new model for multimedia training. Evaluation report for 1999*. Washington DC: US Office of Education.
- Cradler, J., McNabb, M., Freeman, M., & Burchett, R. (2002). How does technology influence student learning? *Learning & Leading with Technology*, 29(8), 46-56.
- Deno, S. L. (1989). Curriculum-based measurement and special education services: A fundamental and direct relationship. In M. R. Shinn (Ed.), *Curriculum-based measurement: Assessing special children* (pp. 1-17). New York: Guilford Press.
- Fuchs, L. S., Fuchs, D., Hosp, M., & Jenkins, J. R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading*, 5, 239-256.
- Gates, W. (1995). *The road ahead*. New York, NY: Penguin Books.
- Hasbrouck, J. E., & Tindal, G. A. (1992). Curriculum-based oral reading fluency norms for students in grades 2 through 5. *Teaching Exceptional Children*, 24, 41-44.

- Hasbrouck, J. E., & Tindal, G. A. (2005). Oral Reading Fluency Norms Data. Retrieved September 10, 2006, from <http://www.readnaturally.com/pdf/oralreadingfluency.pdf>
- Hogarty, K. Y., Lang, T. R., & Kromrey, J. D. (2003). Another look at technology in classrooms: The development and validation of an instrument to measure teachers' perceptions. *Educational and Psychological Measurement, 63*, 139-162.
- Hoover, H. D., Dunbar, S. B., Frisbie, D. A., Oberley, K. R., Bray, G. B., Naylor, R. J., et al. (2001). *The Iowa Tests of Basic Skills: Complete battery (Form A Levels 9-14)*. Itaska, IL: Riverside Publishing.
- Ivey, G., & Broaddus, K. (2001). "Just plain reading": A survey of what makes students want to read in middle school classrooms. *Reading Research Quarterly, 36*, 350-371.
- Jennings, H., & Lucca, L. (2005). Summary of Experimental Study of the *Ready to Teach Developmental Electronic Field Trip Reader Project*, 1 – 10. Retrieved September 10, 2006, from, <http://orcmacro.com>
- Leu, D. J., Jr., Leu, D. D., & Coiro, J. (2004). *Teaching with the Internet: New literacies for new times* (4th ed.). Norwood, MA: Christopher-Gordon.
- Mann, D., & Shafer, E. A. (1997, July). Technology and achievement. *American School Board Journal*. Retrieved August 21, 2006, from, <http://www.asbj.com/achievement/ci/ci10.html>
- National Center for Education Statistics. (1999, December). *Teachers' feelings of preparedness*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

- National Center for Education Statistics. (2000, April). *Teacher use of computers and the Internet in public schools, stats in brief*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.
- National Report on NetDay's 2005 Speak Up event and survey. (2005). *Our voices, our future: Student and teacher views on science, technology & education*. Retrieved August 21, 2006, from http://www.netday.org/speakup_2005.htm
- Pikulski, J. J., & Chard, D. J. (2005). Fluency: Bridge between decoding and comprehension. *The Reading Teacher*, 58, 510-519.
- Rasinski, T.V. (2006). Assessing reading fluency. Retrieved September 10, 2006, from http://www.prel.org/products/re_/assessing-fluency.htm
- Reis, S. M., Eckert, R. D. Schreiber, F. J., Jacobs, J., Briggs, C., Gubbins, E.J., et al. (2005). *The Schoolwide Enrichment Model reading study* (RM05214). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.
- Reis, S. M., & Renzulli, J. S. (1985). The secondary enrichment triad model: A practical plan for excellence without elitism. *NASSP Bulletin*, 69(482), 31-38.
- Renzulli, J. S. (1977). *The enrichment triad model: A guide for developing defensible programs for the gifted and talented*. Mansfield Center, CT: Creative Learning Press.
- Renzulli, J. S., & Reis, S. M. (1997). *The schoolwide enrichment model: A how-to guide for educational excellence* (2nd ed.). Mansfield Center, CT: Creative Learning Press, Inc.
- Siegle, D., & Foster, T. (2001). Laptop computers and multimedia and presentation Software: Their effects on student achievement in anatomy and physiology. *Journal of Research on Technology in Education*, 34, 29-37.