HELP WITH ENGLISH LANGUAGE PROFICIENCY "HELP" PROGRAM EVALUATION OF HELP SHELTERED-INSTRUCTION MULTIMEDIA LESSONS

PURPOSE

Colorado Roaring Fork RE-1 School District commissioned a study to investigate the effects of Digital Directions International's **HELP**© (Help with English Language Proficiency) program on student academic performance. The pilot evaluation was overseen by an independent, renowned statistician, Dr. Zung Tran, who has worked extensively with the National Institutes of Health and other scientific and educational organizations (see Appendix 3 for biography).

The pilot evaluation was generously funded by the Colorado Department Education.
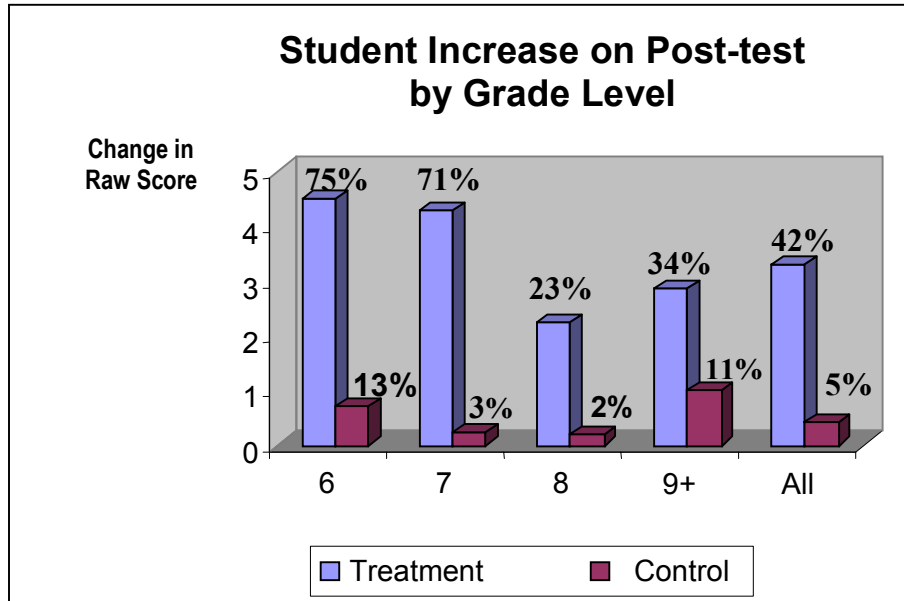
WHAT IS HELP?

HELP© is an internet-based, supplementary curriculum designed to remove language barriers from the learning of math skills and math content. The program is designed to help English Language Learner students (ELLs) in general, and Spanish-speaking students in particular, increase performance in <u>mathematics</u> by providing language acquisition support. It is a comprised of a series of rich interactive lessons that break down mathematical terms and concepts so that students can understand the content. **HELP**© was developed with student participation and is easy to use.

HELP© builds on the research of the SIOP (Sheltered Instruction Observation Protocol researched by the Center for Research on Education, Diversity and Excellence since 1996) model of <u>classroom-based</u> instruction for limited English speakers. **HELP**© takes this successful educational pedagogy, and adapts it, capturing specific techniques of sheltered instruction through interactive, computer-based multimedia. (See Appendix 2 for further detail about the **HELP**© program.)
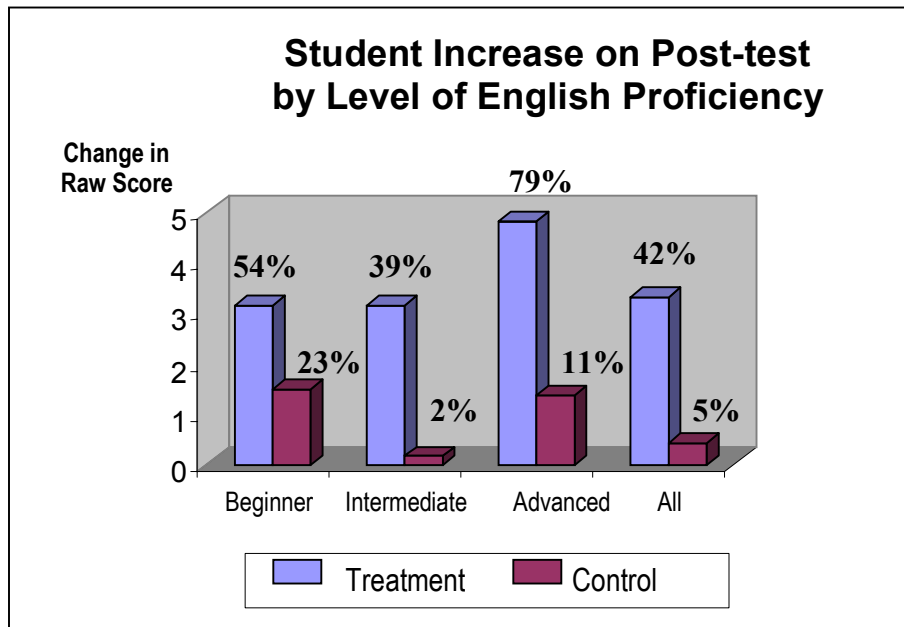
SYNOPSIS – STUDENT EVALUATION STATISTICAL DATA

The results of the pilot evaluation clearly <u>demonstrate that HELP is an effective tool in increasing Latino and other ELL students' learning</u>:

(1) 92% of students that had the **HELP**© "treatment" increased their scores on the NCTM (National Council of Teachers of Mathematics) standards-aligned, post-test.

(2) "Treatment" students using Digital Directions' **HELP**© lessons improved their scores on the standards-aligned, post-test by 42%. This compares with only a 4.6% increase by control students. The net improvement (treatment over control group) of the HELP treatment students was 37.5%.

(3) **HELP**© was <u>especially effective for sixth and seventh grade students, who had the greatest gains in post-test scores with average increases of 75% and 71% respectively.</u>

Student Increase on Post-test by Grade Level

Change in Raw Score

Grade	Treatment	Control
6	75%	13%
7	71%	3%
8	23%	2%
9+	34%	11%
All	42%	5%

(4) The most significant increase in test scores was by advanced ELL students. 100% of advanced ELL treatment students using Digital Directions' **HELP**© lessons improved their scores, with an average improvement on the post-test of 79%.

Student Increase on Post-test by Level of English Proficiency

Change in Raw Score

Level	Treatment	Control
Beginner	54%	23%
Intermediate	39%	2%
Advanced	79%	11%
All	42%	5%

(5) There is no significant difference between the post-test improvements shown by middle school and the post-test improvements shown by high school students, signifying that high school students are responding equally well to the **HELP**© supplementary curriculum.

SYNOPSIS – TEACHER SURVEY FINDINGS & USER FEEDBACK

(1) Evidence garnered during the teacher exit survey and student focus groups indicate that Digital Directions' **HELP**© program is an important motivator and positive contributor to increasing students' perceived ability to succeed in a mainstream math class. Teachers found that **HELP**© lessons captured and held their students' attention. It was reported that on average, a student could spend about 30 minutes. **HELP**© was ranked on average 8 (where 10 was maximum) on levels of student engagement.

(2) Teachers believe that **HELP**© lessons can increase their capability of providing individualized instruction to their students. **HELP**© was ranked on average 8 (where 10 was maximum) on ability to provide individualized and differentiated classroom instruction.

(3) Teachers like how HELP's modular structure allows for multiple applications in a variety of settings. Given current classroom structure and the availability of computers, most teachers said that they plan to use **HELP**© in the computer lab.

(4) Teachers who rated themselves of low to moderate technical ability found the **HELP**© program to be very easy to use. HELP was ranked on average 4.7 (where 5 was maximum) on ease of use.

(5) When asked to identify the section(s) of a **HELP**© lesson they found most useful, teachers reported that they like how the whole **HELP**© lesson works together, indicating that teachers like the digital adaptation and application of the sheltered instruction pedagogy.

PREVIOUS PRIMARY AND SECONDARY RESEARCH

Primary and secondary research shows categorically that language barriers contribute to student failure <u>and that students learn more math, more easily, when the language is understood</u>. With funding from the Colorado Department, the **HELP**© program has been rigorously field-tested by statisticians, instructional designers, and curriculum and assessment specialists in Colorado schools statewide during the past $2^1/_2$ years. The program has been developed through an iterative process of evaluation and application, in which both the components of the program and the theoretical basis upon which they were founded was considered.

Numerous studies also address the issue of language as a barrier to learning content including for example: Harvard University, *The Civil Rights Project* (2002); United States General Accounting Office, *Public Education: Meeting the Needs of Students with Limited English Proficiency* (2001); and the Center for Research on Education, Diversity & Excellence, *Teaching Secondary Language Minority Students* (1999).

HELP© PILOT EVALUATION OBJECTIVES

The primary objective of the **HELP**© pilot evaluation was to determine the effectiveness of the **HELP**© program in increasing mathematics achievement and the primary research question was:

*Is there a significant difference between the mathematics achievement of middle school and high school students using Digital Directions' **HELP**© program and those students not using the program?*

The following table describes the pilot's primary and secondary anticipated outcomes and goals, and the instruments used to measure them.

Anticipated Outcome	Measurement Instrument	Measures Goals	Anticipated Long-term Results
1. Increased math assessment scores of ELL students using the HELP curriculum.	A randomized, pre-post, two-group (treatment, comparison) design.	*Goal 1*: Develop students' skills in math by increasing math literacy. *Goal 2*: Enable students to achieve "proficiency" on the grade-level state math standardized assessments, which largely, have been designed for native English speakers.	a) ELL students better prepared to more quickly enter, and remain in, mainstream classrooms. b) Enable students to achieve "proficiency" in the grade-level Math tests c) Improve students' overall academic English language skills
2. Increase in students' perceived ability to succeed in a mainstream math class.	Observation & focus groups designed to evaluate the changes in attitude & perceived ability of treatment students.	*Goal 3*: Foster enthusiasm for math in the critical years for students, inspire students with greater confidence in their ability to achieve, and potentially play a role in motivating students to stay in high school.	Provide students with greater confidence in their ability to achieve and play a role in motivating students to complete their high school education and move on to higher-ed.
3. Increase in teachers' capability to provide individualized, differentiated education to ELLs.	A teacher survey to determine whether HELP is meeting the teachers' requirements.	*Goal 4*: Enable teachers to differentiate instruction for second language learners.	Teachers find it easier to differentiate the classroom lesson, and provide extra help to students most at-risk.

RESEARCH METHODOLOGY

This study used a randomized, pre-post, two-group (treatment, comparison) design. It investigated the effects of the **HELP**© intervention at a student level. Both treatment and control (comparison) students were given the pre-test in early January 2005 and the post-test in late March 2005. Over the two- to three-month period, only treatment students had access to the **HELP**© lessons. The pre- and post-test measures were created by an external consultant and specialist in assessment design (see Appendix 3 for biography). The measure was a pre-post parallel assessment based on NCTM standards and aligned with the content contained in the **HELP**© program. The tests were further validated by mathematics curriculum experts.

Teachers and administrators were provided with materials explaining the evaluation and the importance of implementing the study as designed. Digital Directions staff provided teachers with the necessary training to implement and supervise the program. In all but one school, Digital Directions staff was present at the first session when treatment students were trained on how to use and navigate **HELP**© lessons. At the conclusion of the pilot, participating teachers were given an exit survey and students were randomly selected to participate in focus groups.

A total of 154 students participated in the **HELP**© pilot across three Colorado school districts (metropolitan to semi-rural) and nine classrooms. 55% of the classrooms were math classes and 45% ELA classes, although in most schools math and ELL teachers worked together to bring about the pilot. In all cases, the students worked on **HELP**© in the computer lab. Students used the **HELP**© program during the school day in all but one school. In that one school, students worked in the computer after school with teacher supervision. During the two- to three-month pilot, six students left their respective schools for a variety of reasons (e.g. drop out, left the country, expelled, etc.).

There were 73 pairs of students when attrition is taken into account. Only paired scores were included in the analysis. The key population characteristics of those 'student pairs' are shown in the tables below (grade level and level of English language proficiency). School district data was used to determine the classification of each student. All school districts participating used the LAS-Language Assessment Scales to classify English language proficiency. The mean grade level of the treatment student was 7.7 (s.d. 1.05) and of the control student was 7.8 (s.d. 1.26). The mean level of English language proficiency was Limited English Proficient for both groups.
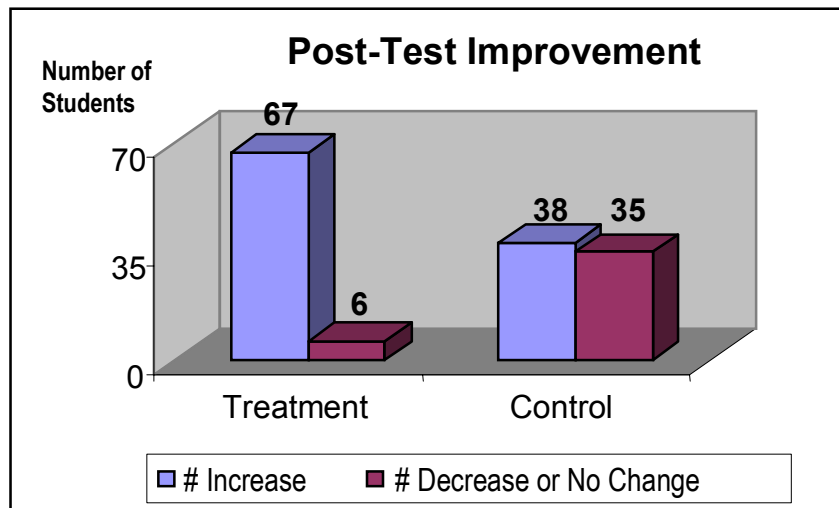
Participants by Grade	Treatment Number	Control Number
ALL*	73	73
Grade 6	8	7
Grade 7	25	25
Grade 8	26	26
Grade 9	9	5
Grade 10+	5	9

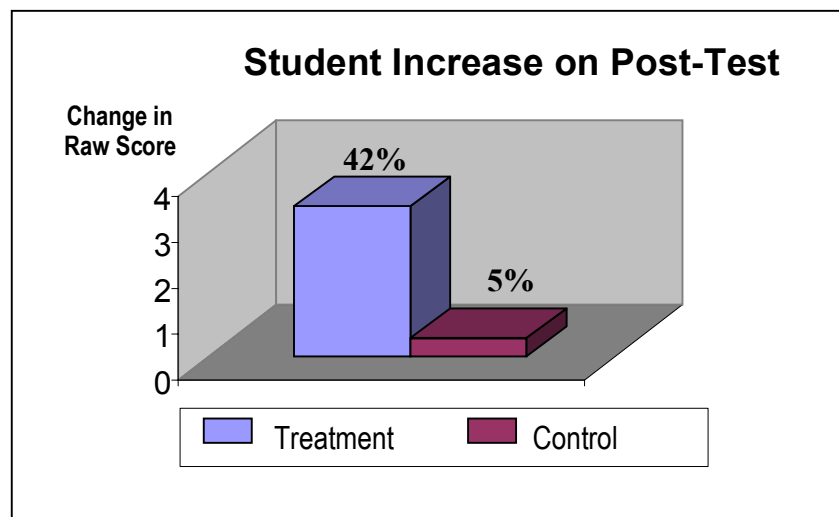| Participants by Level of English Proficiency	Treatment Number	Control Number
ALL*	73	73
Beginner - NEP (Non-English Proficient)	6	7
Intermediate - LEP (Limited English Proficient)	52	47
Advanced - FEP (Fluent English Proficient)	10	13
Exited/Monitor/Mainstream	4	5
Special Ed	1	1

KEY FINDINGS & OBSERVATIONS

1. The results of the pilot demonstrate that **HELP**© is an effective tool in increasing student learning. Analysis of the mean raw scores (as shown in the statistical analysis in Appendix, Tables A-D) demonstrates significant improvement in overall test scores from the pre- to the post-test. **92% of treatment students using Digital Directions' HELP© lessons performed better on the NCTM standards-aligned post-test!** This compares with only 52% of control students who showed improvement.

Post-Test Improvement

Number of Students

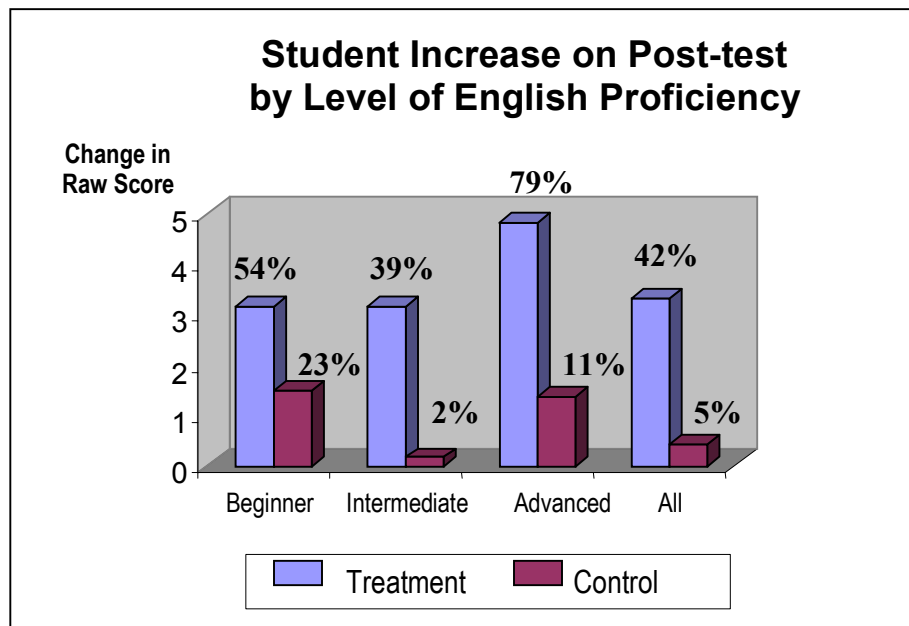|	# Increase	# Decrease or No Change
Treatment	67	6
Control	38	35

2. **Treatment students using Digital Directions' HELP© lessons improved their scores on the post-test by 42.1%. This compares with only a 4.6% increase by control students.** As shown in the chart below, the <u>net improvement (treatment over control group)</u> of the **HELP©** treatment students was <u>37.5%</u> i.e. an increase/improvement in average test scores of over 38%. See Appendix, Table D, for statistical analysis.

Student Increase on Post-Test

Change in Raw Score

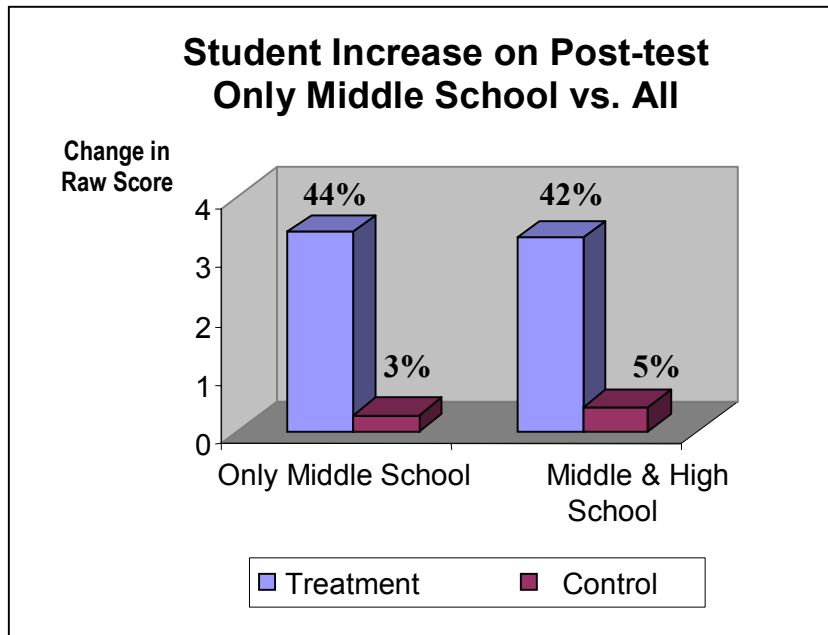| Treatment	Control
42%	5%

3. Analysis of the mean raw scores of each of the sub-groups by level of English language proficiency was performed. Students at every level of English proficiency (Beginner/Intermediate/Advanced proficiency, Mainstream and Special Ed) showed significant increases varying around the mean increase of 42%. The most significant increase in test scores was by advanced ELL students. **100% of advanced ELL treatment students using Digital Directions' HELP© lessons improved their scores, with an average improvement on the post-test of 78.7%.** This compares with an increase of 10.6% for advanced ELL control students. That means the net improvement (treatment over control group) of the HELP treatment students was 68.1% i.e. an increase/improvement in average test scores of over 68%. See Appendix, Table E, for statistical analysis.

Student Increase on Post-test by Level of English Proficiency

Change in Raw Score

Level	Treatment	Control
Beginner	54%	23%
Intermediate	39%	2%
Advanced	79%	11%
All	42%	5%

4. Analysis of the mean raw scores of each of the sub-groups by grade level was performed. In one test, all high school students were excluded from the testing. Notably, the treatment group that had only middle school students scored, on average, just 2% higher than the treatment group that included both middle and high school students. The net difference between the two groups when the pre-test was accounted for was 3.7%. As shown in Table F of the Appendix, **there is no significant difference between the post-test improvements shown by middle school students and the post-test improvements shown by high school students, demonstrating that high school students are responding equally well to the HELP© supplementary curriculum.** See Appendix, Table F, for statistical analysis.

Student Increase on Post-test Only Middle School vs. All

Change in Raw Score

44% 42% 3% 5%

Only Middle School   Middle & High School

□ Treatment   ■ Control

5. Analysis of the mean raw scores of each of the sub-groups by grade level was performed. Students at every grade level (sixth, seventh, eighth and ninth and above) showed significant increases varying around the mean increase of 42%. **The greatest gains in test scores was by sixth and seventh grade students with average increases of 75% and 71% respectively.** This compares with an increase of 13% (sixth) and 3% (seventh) for control students. That means the net improvement (treatment over control group) of the **HELP**© treatment students was 62% (sixth) and 68% (seventh) i.e. an increase/improvement in average test scores of over 62% and 68%.

Student Increase on Post-test by Grade Level
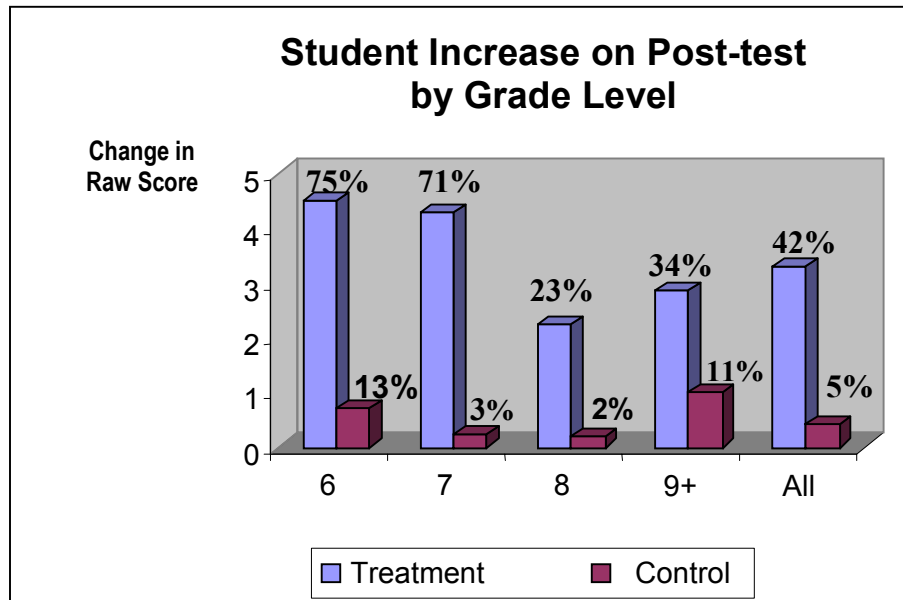
6. Data was collected from student observation and focus groups to test whether **HELP**© meets the goal of fostering enthusiasm for math and inspiring students with greater confidence in their ability to achieve. **Anecdotal evidence indicates that Digital Directions' HELP© program is an important motivator and positive contributor to increasing students' perceived ability to succeed in a mainstream math class.**

The following are a few comments by ELL students in grades six to eight about their previous years of classroom-based, teacher-led math experiences:

Students reported feeling (in their own words) *"dumb", "bored", "waste of time".*

"I'm still guessing what 'perform the operation' means when the teacher is erasing the board. So, I just stop listening and figure I can't do math."

"It <math class> goes too fast and I don't know what's going on so I don't try."

The following are a few comments from ELL students in grades six to eight about the **HELP© experience**:

Students reported feeling (in their own words) *"less stupid", "less lost", "more relaxed",* and *more willing to "figure out what the <computer> teacher was saying".*

"HELP made me feel I'm better in math."

"My math teacher talks too fast. I get it more with HELP when I go at my own speed."

"The music makes it good. When is HELP going to cut a music CD?"

7. Teachers' perceptions were consistent with student comments with respect to meeting the goal of increasing students' perceived ability to succeed in math. On the HELP exit survey, teachers were asked to rank on a scale of 1 to 10 their observations of student engagement, with 1 being a very low level of student engagement and 10 being a very high level of student engagement. The average ranking was 8 as shown in the chart below. **Teachers found that Digital Directions' HELP© lessons captured and held their students' attention.** It was reported that on average, a student could spend about 30 minutes on **HELP©** before "flipping to another web website".

Student Engagement

Level Engaged

7.9

10

0

■ Teachers' Perception
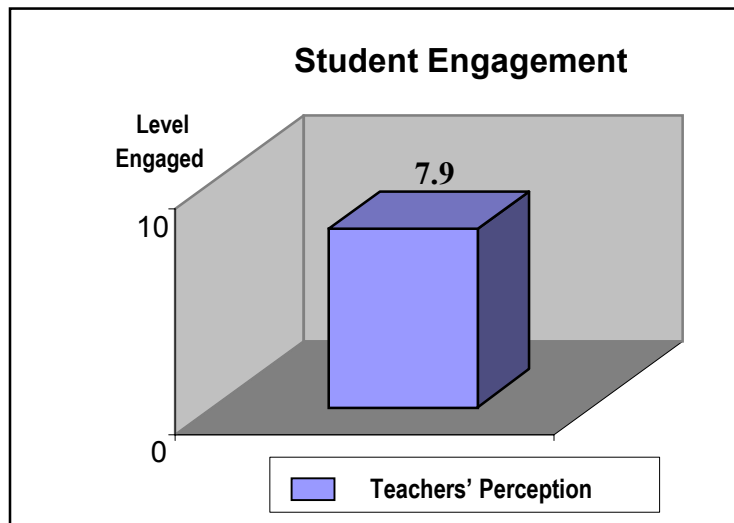
The following are a few teacher comments:

"It's great to see my students so engaged with HELP...and these are kids who come after school to do math!"

"Once the students put on their headphones, they are engaged in the screen and don't seem to be comparing themselves to others...just concentrating on the work."

"Many of my students like being more in control...kids come away feeling they had learned more."

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8. To test whether **HELP©** meets the goal of increasing a teachers' capability to provide individualized, differentiated education to ELLs, teachers were asked (on the **HELP©** exit survey) to rank on a scale of 1 to 10, whether **HELP©** can help them to individualize/differentiate class instruction, with 1 being a very low ability to individualize instruction and 10 a very high ability. The average ranking was 8 as shown in the chart below. **Teachers believe that Digital Directions' HELP© lessons can increase their capability of providing individualized instruction to their students.**

Teachers like how HELP's modular structure allows for multiple applications in a variety of settings including computer lab, individualized in-class instruction, whole class instruction

(white board, multimedia projection), after-school programs and labs, and at-home (parent/child). Given current classroom structure and the availability of computers, most teachers said that **HELP**© will be used in the computer lab.

Ability to Individualize Instruction

Individualize

8.1

10

0

Teachers' Perception
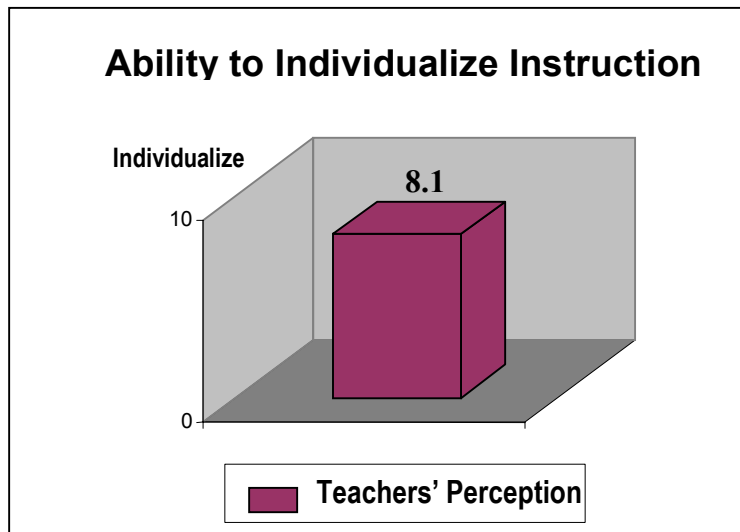
A few teacher comments:

"HELP is a perfect supplemental tool. This will help me reach some students that I otherwise couldn't. As a teacher it will allow me to give more time to the students that respond to my teaching without ignoring those that need extra help."

"HELP reinforces teaching in the classroom; maybe because it helps the kids to better visualize the words and ideas…maybe because they have more time…"

"I don't use the district's new notebook computers because I haven't found good instructional material relevant to my students (middle school math students, 90% Latino). I will use HELP.

9. During the exit survey, teachers were asked about how easy it was to use and navigate the HELP lessons, once the program was loaded on the computer. Teachers were asked to rate the ease of use on a scale where 1 was very difficult and 5 was very easy. The average rating was 4.7 indicating that the **HELP**© program is very easy to use. To assess this rating, teachers were also asked to rate their own technical competence on a scale where 1 was poor and 5 was advanced. The average ranking was 2.5 meaning that teachers rated their own technical knowledge to be low to moderate. Coupling the two answers, **teachers with low to moderate technical ability found the HELP**© **program to be very easy to use.**

Teachers' Ease of Use vs. Technical Ability
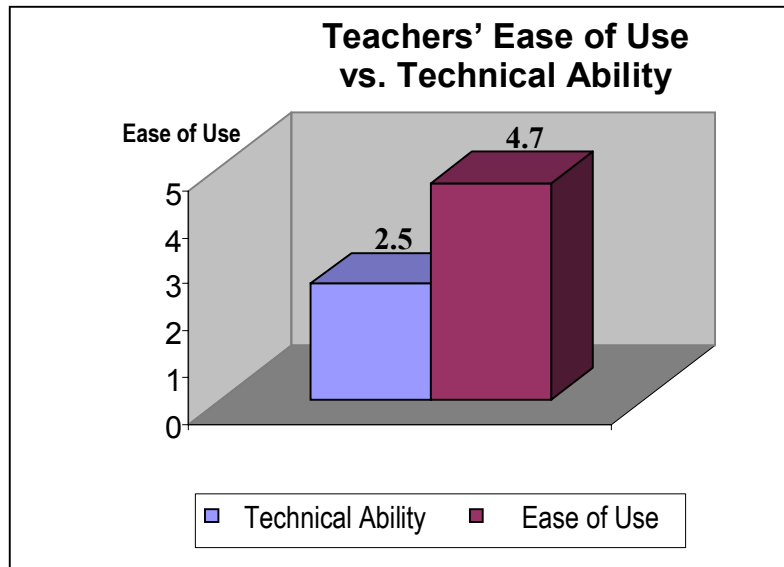
10. During the exit survey, teachers were asked to identify the section or sections (Vocabulary, Instruction, Try-It, Scenario or Game, Test Skills) of a **HELP**© lesson they found to be most useful. The first teacher surveyed asked the evaluator if the following response was allowable: *"the way the whole lesson flows together because each piece of the lesson is important"*. The survey question was then modified to include "the whole program" as one of the choices. **Every teacher surveyed selected "how the whole lesson works together" when asked to identify the section(s) of a HELP© lesson they found most useful, indicating that teachers like the digital adaptation and application of the sheltered instruction pedagogy.**

CONCLUSION

The evaluation demonstrated that **HELP**© significantly improves standards-aligned test scores of Latino and other ELL students. Ultimately, the instructional program has the potential to make a significant, longer-term impact on the education, motivation and engagement of Latino and ELL children by providing a quality instructional tool, which research shows is engaging for students and teachers want to use because it enables them to individualize instruction.

CONTACT

For more information, visit www.helpprogram.net, or contact: Judy Haptonstall, Assistant Superintendent Roaring Fork RE-1 School District at 970-384-6002 or jhaptonstall@rfsd.k12.co.us

APPENDIX 1 - STATISTICAL ANALYSIS

A) Pre-test Raw Scores (baseline) – There were 17 questions on the pre-test. A paired t-test based on differences was used to determine statistical differences of the means. Since the t-test value of .07 was less than the critical value of 1.97 at the .05 significance level (d.f. 144), the difference between the means was <u>not</u> significant. Therefore indicating that **at the 5% significance level (i.e. with 95% confidence), the data provides sufficient evidence to conclude that there was <u>no</u> significant differences between the treatment and the control groups at the baseline, (i.e. the beginning of the study)**. The effect size confirms this finding.

	Treatment Mean Raw Score	Control Mean Raw Score	Absolute Difference	t-value paired, 2-tail	Average s.d. of means	Effect size*
All	7.84	8.87	1.03	.05	3.4	.29

* The statistical "effect size" (also referred to as measures of effect) examines the changes in the mean as a result of an experiment, and is therefore, an effective way of describing the relationship between two groups or two or more sets of numbers (Hopkins, 2000).

B) Treatment Group Pre- and Post Scores - A paired t-test based on differences was used to determine statistical differences of the means. Since the t-test value of 4.5 was greater than the critical value of 2.62 at the significance level of .01 (d.f. 144), the difference between the means <u>was significant</u>. Therefore indicating that **at the 1% significance level (i.e. with 99% confidence), the data provides sufficient evidence to conclude that there is <u>significant improvement</u> in the test scores of treatment students (i.e. students who used Digital Directions' HELP© program). T**he effect size analysis confirms that there is a highly significant difference, indicating highly significant improvement for the treatment group.

	Treatment Mean Pre-Test	Control Mean Post-Test	Absolute Increase	Percentage Increase	t-value paired, 2-tail	Average s.d. of means	Effect size
All	7.84	11.14	3.3	42.1 %	4.51	3.01	1.1

C) Control Group Pre- and Post Scores – A paired t-test based on differences was used to determine statistical differences of the means. Since the t-test value of .05 was less than the critical value of 1.97 at the .05 significance level (d.f. 144), the difference between the means was <u>not</u> significant**,** Therefore indicating that **at the 5% significance level (i.e. with 95% confidence), there is <u>no</u>, nearly trivial, significant change in control group scores of this period**. The effect size analysis confirms this finding.

	Treatment Mean Pre-Test	Control Mean Post-Test	Absolute Increase	Percentage Increase	t-value paired, 2-tail	Average s.d. of means	Effect Size
All	8.87	9.29	0.41	4.6 %	0.11	3.58	0.11

D) Treatment and Control Group Post-Test Comparison – A paired t-test based on differences was used to determine statistical differences of the means. The table below shows the findings of the analysis of the difference between the two groups (treatment and control) on the post test after we adjusted for the pre-test. Since the t-test value of 4.5 was greater than the critical value of 2.62 at the significance level of .01 (d.f. 144), the difference between the means was significant. Therefore indicating that **at the 1% significance level (i.e. with 99% confidence), the data provides sufficient evidence to conclude that there is significant improvement in the test scores of treatment students (i.e. students who used Digital Directions' HELP© program).** The effect size analysis confirms that there is a significant learning improvement for the treatment group over and above the control group.

	Treatment Score Increase Percent	Control Score Increase Percent	Absolute Difference Percent	t-value paired, 2-tail	Average Composite s.d.	Effect Size*
All	42.1 %	4.6 %	37.5 %	4.68	3.3	0.9

* Change in absolute mean treatment score minus change in absolute mean control score divided by the average composite standard deviation.

E) Advanced English Proficient (FEP) Treatment and Control Group Post-Test Comparison – Since the sample size of the two groups differed, a homoscedastic t-test based on differences was used to determine statistical differences of the means. The table below shows the findings of the analysis of the difference between the two groups (treatment and control) on the post test after we adjusted for the pre-test. Since the t-test value of 7.16 was greater than the critical value of 2.09 at the significance level of .01 (d.f. 19), the difference between the means was significant. Therefore indicating that **at the 1% significance level (i.e. with 99% confidence), the data provides sufficient evidence to conclude that there is significant improvement in the test scores of Advanced English proficient treatment students (i.e. students who used Digital Directions' HELP© program).** The effect size analysis confirms that there is a significant learning improvement for the treatment group over and above the control group.

	Treatment Score Increase Percent	Control Score Increase Percent	Absolute Difference Percent	t-value homo-scedastic, 2-tail	Average Composite s.d.	Effect Size
All	78.7 %	10.6 %	68.1 %	7.16	1.72	2.0

F) All Students (Middle & High) Treatment and Only Middle School Treatment Group Post-Test Comparison – Since the sample size of the two groups differed, a homoscedastic t-test based on differences was used to determine statistical differences of the means. Since the t-test value of .8 was less than the critical value of 1.97 at the .01 significance level (d.f. 130), the difference between the means was <u>not</u> significant, **Therefore indicating that at the 1% significance level (i.e. with 99% confidence), there is <u>no </u>significant difference between the two groups.**

	All Treatment Score Increase Percent	Only Middle School Treatment Increase Percent	Absolute Difference Percent	t-value homo-scedastic, 2-tail	Average Composite s.d.
All	42.1 %	44.3 %	2.2%	0.8	2.23

APPENDIX 2 – ABOUT THE HELP PROGRAM

HELP© is an internet-based, supplementary curriculum designed to remove language barriers from the learning of math skills and math content. The program is designed to help English Language Learner students (ELLs) in general, and Spanish-speaking students in particular, increase performance in <u>mathematics</u> by providing language acquisition support. It is a comprised of a series of rich interactive lessons that break down mathematical terms and concepts so that students can understand the content. **HELP**© was developed with student participation and is easy to use.

In the ESL/ELA (English Language Acquisition) classroom, ELLs are taught language arts and conversational English, but are not systematically taught the technical and specialized language of a mainstream math classroom. **HELP**© teaches the meaning of key concepts (e.g. fractions, ratios, exponents, etc.) and their associated vocabulary (e.g. numerator, dividend, rate, radicals), as well as the required academic language (e.g. simplify the equation, evaluate the expression, etc.) students need to comprehend to achieve in mathematics both in the classrooms and on the critical standardized state assessments.

HELP© builds on the research of the SIOP (Sheltered Instruction Observation Protocol researched by the Center for Research on Education, Diversity and Excellence since 1996) model of <u>classroom-based</u> instruction for limited English speakers. **HELP**© takes this successful educational pedagogy, and adapts it, capturing the principles of sheltered instruction through interactive, computer-based multimedia. HELP's Sheltered Instruction incorporates specific techniques of the SIOP model, such as visuals, repetition, synchronicity and building on prior knowledge, to make math instruction comprehensible to the ELL student while simultaneously developing English language proficiency.

HELP© lessons incorporate voice, music, visuals, text and interactivity in order to keep students engaged in ways that textbooks or lectures cannot. **HELP**© provides individualized instruction; tailored to students' needs at different ages, grades and literacy levels. Although all content is taught in English, native language support is always available within the context of the lesson. The personal nature of the software, and learning experience that it provides, helps alleviate student anxiety and enables students to settle down, take time (at their own pace), focus, and learn the vocabulary and math concepts and skills. Home language support is <u>always available</u>, e.g. Spanish. The student simply needs to click a "Key Terms tab" to get a definition in English and Spanish as well as a visual example. Key terms can also be opened from hyperlinks within the instruction.

There are 12 lessons in the **HELP**© **Numbers Make Sense** Series. The lessons align to the National Council of Teachers of Mathematics "NCTM" Principles & Standards Grades 6-8, as well as to selected State math standards (CO, CA, NY, FL) at the finest level of detail – the Assessment Framework. **HELP**© also aligns to English Language Acquisition "ELA" best practice principles including the Colorado Department of Education ELL Guidebook draft October 2004, TESOL (National Association of Teachers of English to Speakers of Other Languages) Standards and a composite of a variety of school districts' English Language Development continuums. Since **HELP**© directly aligns to NCTM, with minor modifications, **HELP**© content can readily be adapted to

the requirement of any state.

Each multimedia, interactive lesson includes the following components:

Section 1: Vocabulary - Key concept vocabulary is explained using home language support. The student is exposed to the key vocabulary repeatedly seeing and hearing the word used in context, preparing the student to understand and apply the word.

Section 2: Instruction - This is an instructional piece with interactivity in which vocabulary is taught in the context of a math lesson. Key terms are repeated over and over in context and reinforce the student's understanding of the meaning of the word, as well as the math concept itself.

Section 3: Try-It! – Student practices using vocabulary and math key concepts in standardized assessment type questions, with interactive feedback. These are "bite size" math assessment questions, in which the student learns how to read the key terms.

Section 4: Scenario or Game – Student engages with a game or 'real world' scenario, in which vocabulary and math key concepts are applied in a fun and interesting way.

Section 5: Test Skills – This is an <u>instructional</u> assessment question in which the student learns to read and comprehend State 'look alike' "high stakes" assessment questions. The student learns how to approach standardized test questions in a non-threatening environment, with interactivity and feedback loops.

Section 6: Final Quiz – A short assessment to determine whether the student has acquired proficiency in the lesson content or whether further review is required. The teacher and student will have access to the graded quiz and reports.

HELP© courseware is delivered online, via CD-ROM or on the school's local server. Students can access the course in class, lab, library, community center, at home or wherever there is access to a computer. Professional development and teacher training will accompany the courseware (currently in development).

APPENDIX 3 – KEY BIOGRAPHIES

Zung Vu Tran, Ph.D.

Currently, Dr. Tran serves as Professor and Senior Biostatistician in the Division of Psychosocial Medicine at National Jewish Medical & Research Center in Denver, Colorado. He is, since 1997, a Clinical Professor in the Department of Preventive Medicine & Biometrics at the University of Colorado Health Sciences Center, Denver. He also serves as Vice President of Research for Learning Information Technologies in DeLand, Florida.

Dr. Tran has been the Principal Investigator/Program Director of numerous research studies and author of over seventy peer-reviewed publications. He is also a Co-Investigator/Senior Biostatistician on several "on-going research support". Since 1982, Dr. Tran has served as a professor and statistical researcher at Texas Christian University, Arizona State University, University of Colorado, Boulder, University of Northern Colorado, and The Center for Research in Ambulatory Health Care Administration, and was Vice President of Research & Development for e-Vitro, Inc. in Boulder.

Dr. Tran received his BS in 1971 in engineering from Clarkson University (Potsdam, NY), his MA in 1977 in mathematics from Temple University (Philadelphia, PA), and his PhD in 1982 in statistics from the University of Colorado, Boulder. He was a member of the 2000 Colorado Governor's Council for Physical Fitness, Statistical Consultant & Associate Editor for *Medicine & Science in Sports & Exercise* (the official journal of the American College of Sports Medicine), a Chartered Member in the NIH Epidemiology & Disease Control-1 Study Section, and is a member of the American Statistical Association, a Fellow in the American College of Sports Medicine, and the Royal Statistical Society.

Bernice German, A.B.D. Ph. D.

Ms. German holds an A.B.D. Ph.D in Math Education (Curriculum and Instruction, Assessment) from the University of Colorado, Boulder and an M.A. Physics from Washington University; St. Louis, Missouri. Ms. German is President of the International Society for Performance Improvement (ISPI), Colorado Chapter and is affiliated with the National Council of Teachers of Mathematics. She has fifteen years experience with national and state educational standards and is an expert in assessment design. Ms. German has designed paper-based and online assessments and courses in math and science for a number of colleges and publishers including Harcourt College and Jones International University.

Ms. German is a Colorado Licensed secondary math teacher and a highly qualified teacher in science. She is also certified in Performance Technology, a joint certification of ISPI and ASTD. Since 1993, she has been a classroom teacher in a range of Denver- and Boulder-based schools, teaching math and science. She has a track record of improving student achievement and has been highly successful teaching diverse groups of students.