Randomized Controlled Trial of Keyword Learning With Elementary and Secondary Students in Zimbabwe: Immediate Effect on Punctuation Ability

Compiled from Data Provided by Associates in Zimbabwe

By Mary J. Duda B.S., M.Ed., Ph.D.
Research Specialist For Applied Scholastics International
St. Louis, Missouri
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ABSTRACT

Citations:

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How a Small Rural School District Reduced the Achievement Gap with Study Technology. Applied Scholastics International, St. Louis, Missouri, 2004.

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Background: "Keyword Learning" is a method of the educational pedagogy known as "Study Technology". It has been used successfully in the Applied Scholastics™ network to increase student performance in school subjects. Two recent impact studies of Keyword Learning involved underachieving, economically disadvantaged fifth through tenth grade students in both urban and rural schools in the southern United States. While both interventions were associated with substantial increase in academic achievement, neither study employed a randomized control group.

Purpose: The purpose of the current report is to present impact analysis of Keyword Learning with data collected in a randomized controlled trial in Zimbabwe with school students of ages similar to those in the earlier studies.

Setting: Four rural and urban schools in the Midlands Province of Zimbabwe in November 2004.

Study Sample: One hundred and twenty-four students were involved, sixty-two as experimental students and sixty-two as controls. Seventy-six were elementary age and forty-eight were in high schools. The students were almost equally divided between rural and urban locales.

Intervention: Working both individually and in pairs for thirty minutes, experimental students learned the definitions of words associated with English punctuation. The list of words to be learned during the intervention contained only those that had already been encountered during classroom instruction.

Research Design: Randomized controlled study in which students in four classrooms were randomly assigned to the experimental group or the control group for four identical trials.

Control Condition: Control students were kept apart from experimental students in a separate room during the intervention. They received the intervention after the post-test.

Data Collection and Analysis: A pre-test of punctuation ability was administered to experimental and control groups just prior to the intervention and again immediately afterward. The test was constructed by the project director and included only material already presented in the four classrooms. The test required students to apply the rules of punctuation. Changes in performance from the pre-test to the post-test were compared for the experimental and control groups and for subgroups based on school locale (rural or urban) and ages of students (elementary level or high school level).

BACKGROUND AND PURPOSES

In his educational writings, educator and humanitarian, L. Ron Hubbard emphasized the importance of vocabulary knowledge in the learning process. Of the three main barriers that prevent a student from comprehending what he studies, the misunderstood word is said to be the most virulent in its effects (Basic Study Manual, 1992). A key point is that it is the misunderstood word that establishes lack of aptitude in a subject.

The misunderstood word precedes the student's inability to act or perform in a subject and can eventually cause the student to give up a subject altogether. Conversely, if the student's misunderstood words in a subject are found and cleared up, resurgence of interest and ability in a subject will ensue. The conceptual understanding of words is a cornerstone of "Study Technology," the educational pedagogy developed by Mr. Hubbard.

While misunderstood words can appear in any sphere of study or life in general, Mr. Hubbard called special attention to the dependence of ability in any particular field of knowledge or action upon the specific nomenclature of that field. A person who is seen as "lazy," "slow," "sloppy," "careless," "or a troublemaker" may simply be suffering from lack of knowledge of the specialized vocabulary of the activity (English Grammar Glossary, 2004). Other educators as well have called for an emphasis on vocabulary development, including instruction in the specialized vocabulary of academic

content areas (Baker, Simmons and Kame'enui, 1995).

In the practice of Study Technology many techniques are employed to help students prevent or overcome the effects of misunderstood words. One of these techniques is Keyword Learning, in which the student is assisted in understanding the nomenclature associated with a particular activity or subject of study. The process is concentrated on removing any barriers to understanding, the main one being misunderstood words (such as even might appear in the definition of another word) and applying word meaning in ways that develop conceptual understanding. Specific protocols are followed to achieve these purposes. While often used as a tool in remediation of academic deficiencies of students, the technique is applicable whenever an improvement in performance is desired.

An impact study of Keyword Learning was conducted in the 2003-2004 school year with two hundred and twenty seven severely underperforming students in grades five through eight in an impoverished African-American farming community in Mississippi. Students received fifteen hours of small group Keyword Learning in Mathematics and Language Arts, spread out over the entire school year. The intervention resulted in substantial increase in relative achievement from one school year to the next, as determined by comparison each year with the performance of statewide cohorts on the proprietary state achievement test. The achievement gap was reduced in 2004 by as little as 10.5% in eighth grade math and as much as 53% in sixth grade math and 34.6% in eighth grade language arts.

In the 2004-2005 school year a study of Keyword Learning was conducted in an urban Title I high school with 225 tenth grade English students. In small groups of 4-5 students twice per week between February and April, the students were tutored in the terminology of language arts study. Due to scheduling problems, one class of English students was not included in the intervention. This group of 40 students served as a comparison group. On the annual statewide achievement test for tenth grade English in Spring 2005 the tutored students substantially outperformed the control students, with a much higher percentage of students scoring in advanced and proficient categories (84% compared to 30%). On a state analysis of school effect, the tenth grade English category jumped from 27th percentile in 2004 to 75th percentile in 2005.

The current trial seeks to test the proposition that learning the terminology of English punctuation will improve the ability of students to apply the rules of English punctuation and result in increased performance on a test of punctuation ability.

Myriads of students in the United States and around the world fail to achieve academic standards and there is much agreement on the need to find and validate practices that increase the impact of schooling. Keyword Learning is a simple technique based on the accepted truth that learning is a language- based activity. The technique has been demonstrated to produce results with underachieving and economically disadvantaged students and can be implemented in a variety of formats (e.g., one-on-one tutoring, group instruction, cooperative learning, etc.) with a minimum of preparation or expertise. The potential of this simple technique to improve performance for all students, and not only in academic areas, but in other spheres of activity as well, should be of interest to educators and policymakers.

METHODS

The Setting

The study took place in November 2004 in four schools in the Midlands Province of Zimbabwe. Zimbabwe, (formerly known as Rhodesia) is situated in south, central Africa. It has an estimated population of 12 million, and is similar in size to the state of California. The country is rich in natural resources and has well-developed mining, manufacturing and agricultural industries. Across Zimbabwe, large numbers of people (approximately 70% of the population), live in small rural communities, growing their own food, following their traditional ways of life, aimed primarily at self-sufficiency. In these scattered communities, all members of the family, both young and old, work together, carrying out their customary roles. Family life is stable. It is very safe for children to wander freely over large distances. Even families living in urban areas, where there is transport and electricity and thus access to other (Western) influences, still adhere closely to the traditional ways of life in rural Africa and uphold its value.

Most schools in Zimbabwe are funded and run by groups such as churches, trusts, companies and quasi-governmental local units. Only about eight percent of schools are governmental but most schools receive some form of governmental subsidy. Schools are not free, but in most communities there are private or government funds for tuition assistance to those who cannot afford to pay. In both urban and rural communities alike, there is a great respect for the schooling and advancement of

the young. Hence the focus of government has been on access and expansion in education and since Independence in 1980, great strides have been made in that direction.

The Sample

In Zimbabwe there is considerable variability in the size of both rural and urban schools, which range in enrollment from three hundred students to one thousand. Urban schools tend to have the larger enrollments. In all schools the pupil-teacher ratio is kept constant at 40 students per teacher. Schools are organized on two levels. Primary schooling is for children from six years to thirteen years of age approximately, similar to American elementary schools. Secondary schooling starts at thirteen to fourteen years of age and lasts for four years. Some schools have been upgraded to cover six years of education and these are called High Schools. Another variable that differentiates Zimbabwean schools is type of locale (i.e., rural vs. urban).

For this trial the participating schools were chosen by the Zimbabwean project director to represent variables more or less equally, rather than to achieve a cross section of the school population. Thus, two of the participating schools are in urban areas and two in rural areas, though in actuality there are many more rural students than urban in Zimbabwe. Likewise, two of the participating schools are elementary schools (known as primary schools in Zimbabwe) and two are high schools, though in actuality there are many more elementary school students than high school students. Sizes of the four schools range from medium to large enrollment of 513 (Shurugwi High School), 650 (Vungwi Primary), 865 (Bata Primary) and 922 (Tongogara High School).

Another factor in the choice of schools was the anticipated degree of cooperative support for carrying out the trial. The project director had established working relationships with the four schools in prior Study Technology interventions. However, participation of the schools was voluntary and at the discretion of the Head (i.e., principal).

The age levels of participants was determined in advance in order to provide two distinct age groups for the trial. Choice of a specific classroom in each school was left up to the Head and was actually determined by availability, as some classes had already finished end-of-year tests and disbanded. Students in the two elementary schools were approximately 11 years 6 months old and students in the two high schools were in the range of 15 to 16 years. There were more girls than boys in the sample, 54% girls and 46% boys, but no consistent pattern. For example, two of the four classrooms had more girls than boys, one had more boys than girls and one had the exact same number of boys and girls. Altogether, one hundred and twenty-four students participated, sixty in rural schools and sixty-four in urban schools. Seventy-six were elementary students and forty-eight were in high schools.

Prior to the interventions – the trial was conducted in four identical interventions – students in the four chosen classrooms were randomly assigned to experimental and control groups, resulting in a total of 62 students in each group. All of the students, both experimental and control had received the same prior instruction in English punctuation.

On the pre-test, experimental and control students scored virtually the same on the average (see table on page 11). The main single exception occurred in Tongogara High School where control students scored 11.7% higher on the pre-test than experimental students. Experimental and control students in the two urban schools scored 22.2% higher on the pre-test than experimental and control students in the two rural schools and experimental and control students in the high schools scored 10.8% higher than experimental and control students in the elementary schools.

Zimbabwe boasts a high literacy rate (91% literacy in 2003). Students are bi-lingual. English is spoken quite fluently and after their first year of school, students receive instruction entirely in English.

Pre-and Post-Testing, Random Assignment and The Intervention

The associate in Zimbabwe, previously trained by Applied Scholastics, was appointed to conduct a trial of Keyword Learning, including selection of participating schools, selecting a subject area to be tutored, construction of a key word glossary to be used in the trial, construction of an instrument to serve as pre- and post-test, random assignment of students to experimental and control groups, pre- and post-testing of students and conduct of the intervention.

Once the participants were identified, preparation for the trial consisted of selecting the subject and preparing a glossary to be used by the students during the intervention. The subject of English punctuation was chosen because it is considered an essential basic in Zimbabwe education and because student outcomes could be objectively assessed. From a glossary of

English grammar terminology published by Applied Scholastics, punctuation words were selected that had been encountered by the students in earlier classroom instruction (but not actually defined during that process). Eleven words were identified for use in the trial. The words were arranged to form a smooth sequence and compiled into a one-page glossary of punctuation words and their definitions. The definitions of those words were reviewed by the project director to identify any words in the definitions that might be misunderstood and any such words were defined orally for the students during the exercise. A copy of the glossary is shown in Exhibit A.

The trial was carried out over a three-day period. However, in each classroom the actions were completed all on the same day. Testing, random assignment and intervention were carried out seamlessly in the following manner:

(1) The project director announced a punctuation test and gave each student a blank piece of paper and a copy of the punctuation test containing thirteen unpunctuated sentences (see Exhibit A).
(2) Students copied the sentences on to the blank paper, adding punctuation as appropriate. The time allowed was 15 minutes and all students finished.
(3) The students were then divided into two groups according to their seating (in the standard Zimbabwean classroom students are seated two to a table in rows of tables). For example, in East- or West-facing rooms students seated on the north side of the table were sent to one corner of the room and students seated on the south side of the table were sent to another corner of the room. One child came from each group to participate in a coin toss on behalf of the others, with the winning group becoming the experimental group and the remaining group serving as the control group.
(4) The control group was instructed to hand over their answer sheet to the front of the room as they exited to another classroom nearby. They were instructed not to discuss the punctuation test while out of the room for the next 35-40 minutes and were seen to comply with this instruction. The answer sheets were marked to designate them as control group pre-tests.
(5) The experimental group was instructed to hand over their answer sheets to the back of the room. Answer sheets were marked to designate them as experimental group pre-tests.
(6) The experimental group members were then instructed to return to their seats and pair up for the exercise that was about to begin.
(7) Each student was given a copy of the punctuation glossary.
(8) Students were instructed to study the glossary individually and then work with a partner to check each other out.
(9) In checkouts, each student in a pair alternately checked out his partner on several words from the list and in turn was checked out on several words until both students had addressed all eleven words or time ran out. Checkout of a word was to consist of having the student tell the definition in his own words, not verbatim, and then give numerous examples of use of the concept. For example, make up a sentence in which a capital letter is used to designate a proper noun.[1]
(10) The study and checkout process was timed for exactly 30 minutes. All students completed the checkout and resumed individual study before the thirty minutes ended.
(11) After the intervention control students were brought back into the classroom immediately and all students were post-tested. Answer papers were collected and marked as before.
(12) The control group then received a copy of the punctuation glossary and time to study it.
(13) The experimental and control groups had remained intact throughout the process and complete pairs of test scores were available for analysis.

Measurement of Outcomes

The instrument used for pre- and post-testing was constructed by the project director. It consists of thirteen unpunctuated sentences to which students were instructed to add appropriate punctuation as they copied the sentences to the

1 The intervention, as implemented, had a serious shortcoming. In Keyword Learning a dictionary is an essential item, regardless of the use of a glossary. Whenever a student does not grasp a word definition or demonstrate the ability to use the underlying concept appropriately there is a misunderstood word in the definition. The student would be assisted by his partner in finding the misunderstood word and using a specific five-step procedure to achieve understanding. This part of Keyword Learning was omitted from the trial because of the limited availability of dictionaries in many schools. Thus misunderstood words were not cleared up and students did not achieve 100% proficiency, as should have been the case.

answer paper. The number of possible correct punctuations for the thirteen sentences is 100. A copy of the test is shown in Exhibit B. The correct answers are shown in Exhibit C. The test has high face validity as it clearly assesses a student's ability to apply rules of punctuation. Its reliability is enhanced by the complete objectivity of scoring. Retest reliability was demonstrated in the post-test scores of the control group, which varied not more than three-tenths of one percentage point in any one classroom and on the overall average did not vary at all (see Table I below). The fact that the test was administered by the project director could be seen as a flaw in the objectivity of measurement.

The test was given immediately before and immediately after the intervention so as to establish a definite baseline and measure the immediate result of the intervention. Because the intervention was subsequently delivered to the control group, there was no opportunity to determine whether the experimental students retained the relative advantage over time. It has not been determined whether the test items were of equal difficulty; therefore differences between pre-test and post-test scores can be interpreted as showing the direction of change but not the exact magnitude of change.

RESULTS

A controlled trial involving the use of pre-and post-testing to assess change was conducted with a "teacher-made" test of punctuation ability. The test produced raw scores designating the number of items answered correctly. With these data, due to the limitations of ordinal scales, the exact magnitude of differences cannot be known with certainty and in spite of adequate sample size, statistical analysis is not appropriate. With these limiting factors in mind, the analysis below is based on mere inspection of the data. While the calculations of changes and differences that are presented in the table below may appear to be precise, they must be interpreted as approximate.

The trial was successfully carried out in that: (1) the experimental and control groups were equivalent as regards the key characteristic – punctuation ability (the two groups scored virtually the same on the pre-test); (2) there was no attrition to create differences between experimental and control students before the post-test; (3) control group members were kept completely separate during the intervention; and (4) outcome data was available for all participants.

To better understand the potential of Keyword Learning for improving educational outcomes in Zimbabwe schools it would be useful to know how well it works, relatively, according to the main variables represented in the participating schools – ages of students and locale of the school. Indeed, both younger students and rural students entered the trial with lower pre-tests scores on the average than their older or urban counterparts, suggesting that these variables might exert an influence on outcomes. To allow for inspection of this possibility results were calculated for these subgroups as well as for the entire sample. Compilations of the pre-and post-test scores are presented in Table I, Pre- and Post-Test of Punctuation Ability, Scores By Subgroup and Overall and in Table II, Pre- and Post-Test of Punctuation Ability, Scores of Experimental and Control Students by School.

Summary of Inspections

- On the overall average, the scores of experimental students increased by 17.0% on the post-test while the average for the control group was exactly the same on the post-test as on the pre-test.65% of the experimental students made double-digit percentage gains on the post-test.
- In each subgroup – school, locale

TABLE I. PRE-AND POST-TEST OF PUNCTUATION ABILITY SCORES BY SUBGROUP AND OVERALL

	EXPERIMENTAL GROUP				CONTROL GROUP			
	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE
OVERALL AVERAGE	4141	4844	703	16.98%	4118	4118	0	0.00%
ELEMENTARY SCHOOLS (N= 76)	2431	2802	371	15.26%	2428	2430	2	0.08%
HIGH SCHOOLS (N=48)	1710	2042	332	19.42%	1690	1688	-2	-0.12%
RURAL SCHOOLS (N=60)	1745	2141	396	22.69%	1841	1842	1	0.05%
URBAN SCHOOLS (N=64)	2396	2703	307	12.81%	2277	2276	-1	-0.04%

TABLE II. PRE-AND POST-TEST OF PUNCTUATION ABILITY SCORES OF EXPERIMENTAL AND CONTROL STUDENTS, INDIVIDUALLY BY SCHOOL

EXPERI-MENTAL GROUP	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE	AGE Yrs-Months	GEN-DER	CONTROL GROUP	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE	AGE Yrs-Months	GENDER
BATA PRIMARY SCHOOL													
1E	81	83	2	2.47%	12--7	F	1C	74	74	0	0	11--10	M
2E	80	86	6	7.50%	11--8	F	2C	78	81	3	3.85%	12--6	F
3E	67	92	25	37.31%	12--2	M	3C	84	83	-1	-1.19%	11--3	F
4E	75	82	7	9.33%	12--4	F	4C	84	86	2	2.38%	12--2	M
5E	78	81	3	3.85%	11--10	F	5C	57	57	0	0.00%	12--3	M
6E	82	84	2	2.44%	11--10	F	6C	63	68	5	7.94%	12--2	F
7E	89	96	7	7.87%	12--3	M	7C	80	80	0	0.00%	11--9	M
8E	71	84	13	18.31%	12--6	M	8C	79	78	-1	-1.27%	12--6	F
9E	60	75	15	25.00%	11--9	F	9C	87	88	1	1.15%	12--3	F
10E	60	70	10	16.67%	11--7	M	10C	75	75	0	0.00%	11--8	M
11E	87	97	10	11.49%	12--3	F	11C	90	87	-3	-3.33%	11--8	F
12E	70	73	3	4.29%	11--6	F	12C	86	85	-1	-1.16%	11--9	M
13E	80	82	2	2.50%	12--2	M	13C	88	84	-4	-4.55%	12--7	F
14E	68	88	20	29.41%	12--1	M	14C	72	71	-1	-1.39%	11--10	F
15E	74	76	2	2.70%	12--5	M	15C	58	57	-1	-1.72%	11--5	M
16E	82	93	11	13.41%	12--0	F	16C	76	76	0	0.00%	12--2	M
17E	80	82	2	2.50%	12--4	F	17C	60	65	5	8.33%	12--2	M
18E	96	96	0	0.00%	12--10	M	18C	79	77	-2	-2.53%	11--5	F
19E	76	87	11	14.47%	12--1	M	19C	77	78	1	1.30%	12--5	M
AVERAGE	76.63	84.58	7.95	10.37%	12--1	10F/9M		76.16	76.32	0.16	0.21%	11--11	9F/10M
DOUBLE DIGIT PERCENTAGE GAINS				42.11% of students							0% of students		

TABLE II CONTINUED. PRE-AND POST-TEST OF PUNCTUATION ABILITY SCORES OF EXPERIMENTAL AND CONTROL STUDENTS, INDIVIDUALLY BY SCHOOL

EXPERI-MENTAL-GROUP	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE	AGE Yrs-Months	GEN-DER	CONTROL GROUP	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE	AGE Yrs-Months	GENDER
VUNGWI PRIMARY SCHOOL													
1E	34	44	10	29.41%	9--10	F	1C	38	33	-5	-13.16%	11--6	M
2E	47	48	1	2.13%	10--8	F	2C	55	50	-5	-9.09%	11--1	F
3E	52	63	11	21.15%	11--7	F	3C	27	39	12	44.44%	10--11	M
4E	43	61	18	41.86%	10--10	F	4C	58	62	4	6.90%	10--1	F
5E	96	100	4	4.17%	10--7	F	5C	57	60	3	5.26%	10--3	F
6E	63	65	2	3.17%	10--10	F	6C	44	35	-9	-20.45%	12--4	F
7E	39	51	12	30.77%	11--5	M	7C	55	54	-1	-1.82%	11--7	F
8E	50	51	1	2.00%	11--6	M	8C	67	69	2	2.99%	11--1	M
9E	53	73	20	37.74%	10--0	M	9C	62	60	-2	-3.23%	12--11	M
10E	41	55	14	34.15%	11--3	M	10C	28	25	-3	-10.71%	12--0	F
11E	47	57	10	21.28%	10--3	F	11C	44	55	11	25.00%	11--7	F
12E	58	64	6	10.34%	10--7	F	12C	50	48	-2	-4.00%	10--7	F
13E	42	70	28	66.67%	10--8	M	13C	40	44	4	10.00%	11--11	M
14E	36	57	21	58.33%	10--6	M	14C	72	60	-12	-16.67%	10--0	F
15E	37	56	19	51.35%	11--0	F	15C	54	53	-1	-1.85%	13--0	M
16E	81	83	2	2.47%	11--5	F	16C	62	62	0	0.00%	10--6	F
17E	46	61	15	32.61%	11--11	M	17C	69	68	-1	-1.45%	10--4	F
18E	71	74	3	4.23%	12--1	M	18C	45	49	4	8.89%	12--1	F
19E	39	62	23	58.97%	12--5	M	19C	54	54	0	0.00%	10--4	F
AVERAGE	51.32	62.89	11.58	22.56%	11--2	10F/9M		51.63	51.58	-0.05	-0.10%	11--3	13F/6M
DOUBLE DIGIT PERCENTAGE GAINS				68.42% of students							15.79% of students		

TABLE II CONTINUED. PRE-AND POST-TEST OF PUNCTUATION ABILITY SCORES OF EXPERIMENTAL AND CONTROL STUDENTS, INDIVIDUALLY BY SCHOOL

EXPERI-MENTAL-GROUP	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE	AGE Yrs-Months	GENDER	CONTROL GROUP	PRE-TEST	POST-TEST	POINT CHANGE	PERCENT CHANGE	AGE Yrs-Months	GENDER
TONGORARA HIGH SCHOOL													
1E	78	87	9	11.54%	15--3	F	1C	77	77	0	0.00%	15--11	F
2E	76	92	16	21.05%	17--7	F	2C	81	86	5	6.17%	15--8	F
3E	84	91	7	8.33%	16--1	F	3C	76	79	3	3.95%	16--0	F
4E	71	88	17	23.94%	15--6	F	4C	73	66	-7	-9.59%	17--6	M
5E	57	80	23	40.35%	16--6	M	5C	85	85	0	0.00%	15--6	F
6E	79	84	5	6.33%	15--6	M	6C	78	83	5	6.41%	15--9	M
7E	51	72	21	41.18%	15--6	M	7C	68	69	1	1.47%	16--10	M
8E	86	93	7	8.14%	16--7	M	8C	78	76	-2	-2.56%	16--7	M
9E	72	86	14	19.44%	17--4	M	9C	91	93	2	2.20%	16--9	M
10E	55	78	23	41.82%	15--9	M	10C	75	76	1	1.33%	16--5	M
11E	61	95	34	55.74%	15--10	M	11C	78	72	-6	-7.69%	15--1	M
AVERAGE	70.00	86.00	16.00	22.86%		4F/7M		78.18	78.36	0.18	0.23%	15--1	4F/7M
DOUBLE DIGIT PERENTAGE GAINS				72.73% of students							0.00% of students		
SHURUGWI HIGH SCHOOL													
1E	70	86	16	22.86%	17	F	1C	68	69	1	1.47%	17	F
2E	75	83	8	10.67%	16	F	2C	87	84	-3	-3.45%	16	F
3E	86	96	10	11.63%	16	F	3C	50	51	1	2.00%	15	F
4E	80	93	13	16.25%	16	F	4C	57	58	1	1.75%	16	F
5E	66	78	12	18.18%	16	F	5C	67	66	-1	-1.49%	17	F
6E	67	71	4	5.97%	16	F	6C	60	61	1	1.67%	16	F
7E	69	84	15	21.74%	15	F	7C	83	78	-5	-6.02%	17	F
8E	80	92	12	15.00%	16	F	8C	63	66	3	4.76%	17	F
9E	64	75	11	17.19%	16	F	9C	86	85	-1	-1.16%	15	M
10E	61	77	16	26.23%	16	M	10C	52	50	-2	-3.85%	16	M
11E	66	88	22	33.33%	16	M	11C	30	30	0	0.00%	17	M
12E	76	87	11	14.47%	16	M	12C	55	55	0	0.00%	17	M
13E	80	86	6	7.50%	16	M	13C	72	73	1	1.39%	17	M
AVERAGE	72.31	84.31	12.00	16.60%	16	9F/4M		63.85	63.54	-0.31	-0.48%	16	8F/5M
DOUBLE DIGIT PERCENTAGE GAINS				84.62% of students							0.00% of students		

and age – experimental students improved on the post-test while control students did not.
- Students in the two rural schools gained almost twice as much on the post-test as students in the two urban schools (22.7% increase compared to 12.81%).
- The post-test scores of elementary students improved by 15.3%, while high school students gained 19.4%.
- The highest average score on the pre-test was achieved by the experimental and control students in an elementary school.

DISCUSSION

The intervention in this trial was conducted with a flawed procedure; an essential part of the Keyword Learning process – the use of a dictionary – was omitted. Thus students did not have the opportunity to apply standard procedure for understanding any words that blocked their grasp of the key word definitions. While a few words selected by the project director as likely to be misunderstood were clarified orally during the exercise, that action was not an adequate substitute for learning words conceptually through use of a dictionary and application of the precise method. For maximum results – 100% proficiency in the subject learned – the integrity of the Keyword Learning process must be maintained.

However, in spite of some technical limitations of the study and the flawed intervention, the results show that studying key words improved the punctuation ability of the Zimbabwe students that participated in the trial. The findings suggest that the ages of students, at least at the levels examined in this trial, are not a factor in the effectiveness of the Keyword Learning method. In fact, the students in one of the elementary schools achieved the highest average score on the pre-test. Investigation revealed that this school has been encouraging students to own and use a dictionary. One wonders what the results might have been had these students used dictionaries during Keyword Learning.

The superior gains achieved by students in the rural subgroup could be a function of test construction. In both rural schools the pre-test scores were lower than in the other two schools, thus there was more room for improvement prior to stumbling on any unusually difficult items. An item analysis of the test could clarify this possibility. An alternative explanation of the greater gains of rural students is that students who have been frustrated by lack of vocabulary to a very high degree tend to change their attitude toward the subject when misunderstood words are cleared up and to experience a "resurgence of interest as well as ability in the subject" (Key Word Glossary, 2004). This explanation is consistent with observations of Applied Scholastics in applying the technique with underachieving students in the United States.

It is not too far a stretch to suggest that Keyword Leaning could improve the academic performance of Zimbabwe students across the curriculum. Additional, but smaller randomized control trials of the technique have been conducted with different subject matter and involving two additional Zimbabwe elementary schools in the Midlands. Using tests and glossaries for English Grammar, Environmental Science and Mathematics the trials (carried out exactly as in the punctuation trial, including without dictionaries), produced results similar to those obtained in the present trial.

In the United States Keyword Learning has been evaluated in trials that employed non-randomized comparison groups. Excellent results were obtained in Mathematics and Language Arts instruction. In the context of several successful trials in the United States and Africa with students of similar ages but different ethnic and cultural backgrounds, the technique could now be seen as an effective educational practice, at least for the age groups studied. Keyword Learning is simple, costs little to implement and is so powerful that it works, apparently, even when the process is only partially implemented. Decision-makers should not need to call for additional studies to support its use in educational environments.

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Exhibit A. APPLIED SCHOLASTICS—ZIMBABWE—PUNCTUATION KEY WORDS

PUNCTUATION- The system and method of using marks (symbols) in writing that makes the written communication clearer.

PUNCTUATION MARKS- These marks are used to aid the sense of what is being written and divide the material into sentences and clauses, etc. Examples: period . comma , question mark ?

CAPITAL LETTER- 1. These are tall letters and always larger than a small letter. Examples: Aa, Bb, Cc, etc
2. Capital letters are used as the first letter for all proper nouns. e.g. Precious Mhuri.
3. All sentences start with a capital letter.

PROPER NOUN- The name of a particular person, place thing or idea. Proper nouns always start with a capital letter.

PERIOD- 1. A period is a dot. It is used to show where the end of a sentence is.
2. A period also shows that a word has been made shorter or abbreviated. e.g. Mon. (Monday) ; Dec. (December).
3. A period is also used after numbers or letters to separate them from the words following. e.g. Before you leave: 1. Close the window. 2. Turn off the lights. 3. Lock the door.

COMMA - 1. A comma is used to separate words or groups of words from each other.
2. A comma is used to separate a series of items and actually means "and" or "or." e.g. Joe has pens, paper, pencils and books.
3. When you read aloud, a comma tells you to take a small pause. The comma's function then is to make the sentence clearly understood.

QUESTION MARK- A mark that like this (?) used after a sentence that asks a question.

QUESTION- Something said to another or others to get information. e.g. Where is my dog?

QUOTATION MARKS- 1. Marks used to show exactly what someone said.
2. Quotation marks are also used to enclose titles of magazine articles, songs, poems, movies, chapters of books, articles, short stories and other parts of books and periodicals.

APOSTROPHE- 1. A mark used to show that something is owned or belongs to somebody. e.g. Susan's bike.
2. An apostrophe is used to show that a letter or letters have been left out of a word. e.g. He cannot go. He can't go.

EXCLAMATION POINT- A mark that looks like this ! used to show surprise, strong feeling or to add emphasis. e.g. Oops! Wow! Ouch!

Exhibit B.
APPLIED SCHOLASTICS—ZIMBABWE
PUNCTUATION TEST

Put in capital letters and punctuation marks, where needed:

1 when enos fell into the river he shouted help

2 the guard asked where is your ticket

3 in my pocket i answered

4 the zambezi limpopo congo and niger are four african rivers

5 peter said thats my book

6 the poem bongwi was written by kingsley fairbridge

7 mr tembos car is bright red

8 pinoss uncle lives in mutare

9 the headmaster of rengwe school is mr s moyo

10 next sunday the service will be in all saints church at two oclock

11 no no no exclaimed sarah

12 the west african advertiser is a newspaper

13 tom sam and i are good friends

Exhibit C.
APPLIED SCHOLASTICS—ZIMBABWE
PUNCTUATION TEST ANSWERS

	Marks
1. **W**hen **E**nos fell into the river, he shouted, "**H**elp!"	9
2. The guard asked, "**W**here is your ticket?"	7
3. "**I**n my pocket," I answered.	7
4. **T**he **Z**ambezi, **L**impopo, **C**ongo and **N**iger are four **A**frican rivers.	9
5. **P**eter said, "**T**hat's my book."	8
6. **T**he poem, "**B**ongwi" was written by **K**ingsley **F**airbridge.	8
7. **M**r. **T**embo's car is bright red.	6
8. **P**inos's uncle lives in **M**utare.	5
9. **T**he headmaster of **R**engwe **S**chool is **M**r. **S**. **M**oyo.	9
10. **N**ext **S**unday the service will be in **A**ll Saints **C**hurch at two o'clock.	8
11. "**N**o! **N**o! **N**o!" exclaimed **S**arah.	10
12. **T**he "**W**est **A**frican **A**dvertiser" is a newspaper.	8
13. **T**om, **S**am and **I** are good friends.	6
TOTAL	100