

Computer Assisted Instruction and Elementary ESL Students in Sight Word Recognition

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Abstract

Legislation regarding student performance on state and national tests has raised the stakes for school districts throughout the nation. The mandate for all students to be reading at grade level before leaving the third grade holds school districts more accountable for their students' progress. Currently, there are more English language learners (ELL) in America's schools than ever before. Statistics show that ELLs perform forty to fifty points below their native English speaking peers on national achievement tests. Low achieving students often have not acquired basic literacy skills, which negatively impacts their entire school performance. Research shows that building sight word recognition could help them read more fluently, which in turn helps comprehension. Many studies have been conducted in the last two decades using computer-assisted instruction (CAI) in an attempt to increase English language proficiency in ELLs. Findings regarding the effectiveness of CAI with ELLs have been mixed or inconclusive. Further, very few studies have been carried out with elementary level ELLs. This study measures the results of using computer-assisted instruction with early elementary students when developing their knowledge of sight words.

Keywords: computer-assisted instruction (CAI); English as a second language (ESL); sight word recognition; Dolch Basic Sight Words; English Language Learners; elementary ESL students

Introduction

English language learners lack basic literacy skills and underperform on achievement tests in comparison to their native English speaking counterparts. This underperformance could be a result of many things including a lack of recognition of basic reading sight words. Typical second language learners take approximately two years to become fluent on a social level but can take up to five to ten years to gain academic proficiency. This leaves the English language learner (ELL), also referred to as English as a second language (ESL) learner, well behind his or her peers whose first language is English (Cummins, 2007). Further, lack of proficiency in the ELL's native language can increase the amount of time needed to reach academic norms resulting in a greater gap between them and their native English speaking peers (Thomas & Collier, 1997). Computer assisted instruction coupled with traditional methods may help ELL students perform at grade level faster than traditional methods alone.

The United States has increasingly become a multicultural nation. English as a second language (ESL) enrolment levels rose to nearly 4.5 million students in the 2000- 2001 school year and is the fastest growing population in U.S. schools (Fry, 2007). These ESL students represent 460 different languages (Kindler, 2002). The 2009 report from the National Center for Education Statistics shows that enrolment in the public schools continues to increase. Student enrolment of those categorized as Caucasian has decreased by 22% while the enrolment of students categorized as non-white increased to 44% of the population. The largest increasing group is Hispanic which now makes up 21% of the enrolment in public schools. Data show that Hispanics are among those students farthest behind (Fry, 2007). According to a recent National Assessment of Educational Progress (NAEP) report a majority of 4th, 8th and 12th grade students who are Hispanic scored below the basic level in reading (National Center for Education Statistics, 2006).

By far, the majority first language (L1) spoken by ESL students in the United States is Spanish; spoken by 79% of the students who are ESL (Gonzalez, Yawkey & Minaya-Rowe, 2006). Students in the Hispanic ethnic group represent the highest dropout rate in the nation for 16 to 21 year olds.

The dropout rate for this population has declined since 1980 but it is still high at 21.4%. By comparison, the dropout rate for ethnically white and black students is 5.4 and 8.4% respectively (National Center for Education Statistics, 2009). With the reauthorization of the Elementary and Secondary Education Act in 2001, now known as the No Child Left Behind Act, school districts across the nation have been under pressure to meet Adequate Yearly Progress (AYP). Adequate Yearly Progress measures achievement gains of elementary and secondary students across the nation. Thirty-one percent of 12th grade students who are Caucasian meet proficiency in reading. Students who are ELL continue to experience more difficulty than their peers in attaining proficiency. Only 10 percent of the students who are Hispanic reached proficiency in reading (National Center for Education Statistics, 2009).

Conversational fluency known as Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP) skills that facilitate academic achievement can take many years to acquire (Cummins, 2007). The Bilingual Act of 1968 legitimized the need to provide instruction in the native language of the student in order to provide equal opportunities for learning. Since then many different approaches to educate non-English speaking individuals have been delivered with varying results (Gonzalez, Yawkey&Minaya-Rowe, 2006). Despite efforts to address the learning needs of ESL students, a nationwide study conducted by Thomas and Collier (2002), found that most types of school programs failed to bring ESL students to average achievement on standardized tests of reading. The study examined more than 210,000 student records from across the country over a 5-year span.

When considering the teaching of ESL students, “Integrating technologies into language instruction has become a reality for teachers of English to speakers of other languages (TESOL) practitioners” (Tsai, 2011). Cotton’s (1997) extensive review of the literature on computer-assisted instruction (CAI), found computer use, as a supplement to conventional instruction, produced achievement greater than that obtained by conventional instruction alone. Felix (2001) supports this concept by offering that technology is an outstanding opportunity to add value to the classroom instruction. Additionally, Baturay, Daloglu&Yildirim (2010) suggests the use of technology is “another major function”...that “provide(s) opportunities for learners to practise the language through mechanical activities that are not normally used in the classroom” (p. 314).

In particular, with the instruction of L2 learners, Liou, Wang & Hung-Yeh (1992) concluded that a combination of computer-aided language learning (CALL) supports the acquisition of language more effectively than traditional modes of instruction alone. Although the early body of literature in this area is somewhat contradictory, Jenks and Springer maintain its efficacy (2002). Furthermore, the use of CAI has been shown to augment traditional teaching methods in the education of ESL students (Learning Today, Inc, 2003). Coryell and Chlup (2007) found “an increasingly used modality of instruction in English language learner classrooms is computer technology” (p. 263).

SALL or self-access language learning, is another aspect of e-learning that has been used since the 1980’s. This is a popular and relatively inexpensive way for many L2 learners to gain expertise in a flexible learning style. Flexibility has been proven as desirable aspect of e-learning and SALL for students (Krashen, 1982). By allowing students to practice language acquisition at their own rate, it was hoped SALL would increase learner autonomy and proficiency. However, many researchers such as Lu (2010) caution against the exclusive use of SALL.

When there is no interaction, either between students themselves or between teachers and students, initiative is hard to develop. Besides, the computer-generated guidance can merely be an alternative to traditional human guidance and tutorials, because a computer is just a computer and it cannot operate and respond in a flexible way to meet all learners’ needs. Learning a new language is a dynamic process. (Lu, 2010, p. 357)

Beyond the many testimonials and anecdotal articles there is little research on the effects of CAI with elementary school-aged ESL students and language acquisition conducted within the past decade. In fact, research in the use of CAI with elementary age ESL students is scant despite the enormous amount of products available on the World Wide Web and the accessibility of online programs and lesson plans. One study conducted by Fidaoui, Bahous and Bacha (2010) explored the effectiveness of CAI with fourth-grade ELL students in the area of writing. Although writing is a more advanced skill than simple language acquisition, it is certainly dependent upon effective language acquisition. The study revealed that students and teachers had positive experiences with the use of CAI in the classroom.

Historically, the education of ESL students has developed over time. The 1954 landmark case of *Brown v. Board of Education of Topeka* and the Civil Rights Act passed from 1957 through 1968, helped to usher in a new era of delivering instruction to diverse populations. With the passing of the Bilingual Act of 1968 and The Supreme Court case, *Lau v. Nichols*, the opportunities for equal education for all were once again expanded. *Lau v. Nichols* resulted in a ruling for the support of bilingual education for ESL learners. The suit validated the case that Chinese Americans were receiving unequal educational opportunities from the school district that provided English-only instruction. The variety of educational models, on a spectrum from total submersion in an English only setting to the dual language model, that have been developed and used with non-English speaking individuals since this time have produced wide ranging results (Gonzalez, Yawkey&Minaya-Rowe, 2006). In the most recent report from National Center for Education Statistics, 90% of fourth graders who are ELL fell below proficiency (2009).

In 1964, Lyndon B. Johnson signed the Elementary and Secondary Education Act (ESEA) into law. This federal statute funds primary and secondary education in the United States. These funds are primarily used for professional development, instructional materials, and resources to support educational programs. The law has had several reauthorizations and its current reauthorization is known as the No Child Left Behind (NCLB) Act of 2001. NCLB attempts to close the achievement gap of ELL students by measuring Adequate Yearly Progress on tests scores. NCLB has been criticized by The National Association for Bilingual Education (NABE) as being rigid, punitive and unscientific (Crawford, 2004). The Bilingual Act has been renamed as the English Language Acquisition, Language Enhancement, and Academic Achievement Act. Its emphasis is on English language acquisition and not on the promotion of bilingualism or native language instruction. Districts are penalized if benchmarks for English language acquisition have not been made (Abedi, 2004). Despite the mandates of this statute, students who are ELLs continue to underperform when compared to their native English speaking peers. The 2009 NAEP Nation's Report Card finds that the gap between ELL and non-ELL students remains with fourth grade reading averages of 188 and 224 respectively when 238 is proficient.

Theoretical Framework

Many social scientists posit second language acquisition follows first language acquisition and that there are critical and sensitive periods for learning (Ortega, 2009). This is known as Critical and Sensitive Period Hypothesis. Ortega defines this hypothesis as "a specific period of time early in life when the brain exhibits a special propensity to attend to certain experiences in the environment (for example, language) and learn from them" (2009, p. 13). The brain can be shaped by these events, but only if the events occur within a specified period in a person's development (Ortega, 2009). Hart and Risley (1995) state that children need to learn 800 new words each year from grades kindergarten through second and that children living in poverty are more likely to come from environments where a rich oral language is not provided. This traditionally applies to children in homes where English is not the first language spoken. Therefore, it is imperative that educators find methodologies to help ELLs increase sight word recognition and increase their potential for academic success.

Additionally, Krashen (1981) suggests that those learning a second language require input to process the new information being given. One form of interactive input can be considered in the use of computer based technology. Krashen's long record of research on the topic of second language learners and reading/language acquisition suggests the traditional method of instruction is based on skill-building. The "Skill Building Theory" is a common theory reflected in practice of teaching ELL students. This would include practice of vocabulary words and phrases (Krashen, 2008).

Methodology.

Participants

The 26 participants in this study are ELL students who attend a mid-west urban school district that has approximately 12,500 students. The participants ranged in age from five to nine years and are in kindergarten, first, and second grades. There was a near equal distribution of males and females (see Table 1). These participants were chosen because of their age, their grade level, their attendance in the summer school program, and their scores on the English Language Proficiency Assessment (ELPA), which were either Basic or Low-intermediate. The ELPA expresses proficiency in the English language based on reporting requirements provided for in NCLB: Basic, Intermediate, and Proficient. The L1 of the students varied but most of the participants spoke Spanish at home (see Table 2).

Table One: Grade and Gender

Grade/Number of Students	Female	Male
Kindergarten- 8 students	2	6
First- 15 students	8	7
Second- 3 students	2	1
Totals: 26 students	12	14

Table Two: Students' First Language (L1)

Language	Number of Students
Spanish	16
Arabic	4
Hindi	2
Afrikaans	1
French	1
Gujarati	1
Mandarin	1

Instrumentation

The free public domain website www.netrover.com was used for practice of the Dolch Basic Sight Words (DBSW). This website contained audio flashcards and games using the DBSW. This site was chosen because it was free and offered both visual and auditory cues to enhance learning. It was also accessible and easy for students to use. It did not require keyboarding skills. Students used the mouse to point and click on words they did not know in order to hear the audio version of the word. Words were presented eight at a time and the user was able to click on each word to hear the word spoken. The same words were presented in the same order each practice session. Students were required to read each word aloud. If they did not know a word they could click on it to hear it then they had to repeat the word after they heard it. They had to say each list twice before moving onto the testing page which flashed the practice words across the screen. While on the testing page, the students were also instructed to read the words aloud and to practice this page twice before moving onto the next set of eight words. If they did not remember the word, they could hold the mouse over the word and the computer would read the word aloud to them. Then they were required to repeat the word. They would repeat this procedure for each new set of words until all 220 words were practiced or until the practice session time expired (10 minutes).

The DBSW were chosen because they are the most frequently occurring words in early literature (Bliss, Skinner & Adams, 2006). These are the first words that students learn to read in school and are fundamental in later reading materials. Students were pre-tested and post-tested using the same DBSW list (see Table 3).

Table Three: Dolch Sight Word List

Preprimer	Primer	First	Second	Third
a	all	after	always	about
and	am	again	around	better
away	are	an	because	bring
big	at	any	been	carry
blue	ate	as	before	clean
can	be	ask	best	cut
come	black	by	both	done
down	brown	could	buy	draw
find	but	every	call	drink
for	came	fly	cold	eight
funny	did	from	does	fall
go	do	give	don't	far
help	eat	going	fast	full
hers	four	had	first	got
I	get	has	five	grow
in	good	her	found	hold
is	has	him	gave	hot
it	he	how	goes	hurt
jump	into	just	green	if
little	like	know	its	keep
look	must	let	made	kind
make	new	live	many	laugh
me	no	may	off	light
my	now	of	or	long
not	on	old	pull	much
one	our	once	read	myself
play	out	open	right	never
red	please	over	sing	only
run	pretty	put	sit	own
said	ran	round	sleep	pick
see	ride	some	tell	seven
the	saw	stop	their	shall
three	say	take	these	show
to	she	thank	those	six
two	so	them	upon	small
up	soon	then	us	start
we	that	think	use	ten
yellow	there	walk	very	today
you	they	where	wash	together
	this	when	which	try
	too		why	warm
	under		wish	
	want		work	
	was		would	
	well		write	
	went		your	
	what			
	white			
	who			
	will			
	with			
	yes			

Data Collection

The DBSW are divided into five levels: preprimer, primer, first, second, and third. Students were given a list of the DBSW and asked to point to and identify each word one at a time beginning with the preprimer level and advancing as able to the third level of words. Students were not timed on the pre/post-tests and were given all the time they needed to read each word. The same procedures were followed for both the pre and post-tests. The pre-test data were gathered on the third day of summer school. The study could not start earlier because of attendance issues, which can be significant with this population.

The 26 participants were taken to the library one at a time and given the pre and post-tests in a quiet corner of the room where there was restricted usage. This area was reserved for the researcher's work and was off limits to other students and staff. No other students were in the library during pre and post-tests administrations. The researcher administered the pre and post-test and also administered the intervention. The intervention was applied for 14 practice periods and the post-test was given after the 14th practice period. The data was collected by using a copy of the same words students read to the researcher. The script found in Table Four ensured consistent instruction and methodology be used for each student. Each student was given an identification number to assure confidentiality once analysis was completed.

Table Four: Student Script

Today you are going to practice the Dolch sight words. You will click on the crazy arrow to find the words you will start with. When the words come up on the screen, you will say each word aloud. I need to hear you saying the words. If I cannot hear you saying the words, I will ask you to repeat them so that I can hear you. If you do not know a word or cannot remember it, click on the word and the computer will tell you how to say it. After the computer tells you the word, you must repeat the word. When you get to the bottom of the list you must go back to the top and say the words again. After you have read the words two times, you may take the test. Click on the crazy arrow and it will take you to the next page. Say the words as they appear in the box. If you do not remember the word, hold the mouse over the box and the computer will say the word for you. You must repeat the word after the computer says it for you. You must practice the list two times on the testing page before you go on to the next list. Do the same thing for the next lists until our time is up or until you get to the last list of words.

Data Analysis

A parametric paired t test A matched pairs design, with the subjects as their own control, was used to determine if the intervention had an effect. The paired t test is used to compare means on the same or related subject over time or in differing circumstances, such as a pre and post-test. The repeated measure ANOVA is an extension of this test. Scores were calculated by number of words read correctly minus words read incorrectly.

Results and discussion

Although the number of participants (n=26) was a small convenience sampling, the results may be considered relevant considering the number of different languages spoken as first language. A paired difference t-test was conducted to compare word recognition skills in ELL elementary students before and after use of computer assisted instruction. Analysis showed statistically significant difference in the number of correct words for pretest (M=66.15, SD=62.36) and post-test (M=95.04, SD=76.68) performances; $t(25) = -13.73$, $p = .001$. The results suggest that the K-2 students demonstrated an increase in word recognition skills when computer-assisted instruction augmented regular classroom teaching for ten minutes daily over a two week period.

The Mann-Whitney test ($p=0.71$) showed no relationship between gender and testing outcomes, although girls did demonstrate a higher increase in number of words recognized in comparison to the boys. The Kruskal-Wallis test determined that attendance was not a factor in the post-test scores ($p=2.40$). A paired samples correlations analysis ($r^2 = .764$) showed a relationship between the pretest and post-test scores; students with higher pretest scores also demonstrated higher post-test scores.

Table Five: Student Demographics and Test Results

Student	Gender	Age	Grade	Days Absent	Pre-test	Post-test	L1
1	female	5	K	4	22	24	Spanish
2	male	5	K	0	1	6	Spanish
3	female	5	K	2	34	80	Gujarati
4	male	6	K	2	30	34	Spanish
5	male	5	K	2	25	25	Spanish
6	male	5	K	1	61	79	French
7	male	6	K	0	21	41	Spanish
8	male	5	K	3	5	11	Spanish
9	male	7	1	4	33	38	Spanish
10	female	7	1	0	210	211	Arabic
11	male	6	1	2	31	28	Spanish
12	female	6	1	2	110	212	Afrikaans
13	male	6	1	0	209	220	Mandarin
14	female	6	1	1	8	24	Spanish
15	female	6	1	3	208	212	Arabic
16	male	7	1	5	85	84	Spanish
17	male	6	1	6	3	7	Spanish
18	female	7	1	0	85	162	Arabic
19	female	7	1	1	80	87	Spanish
20	female	7	1	0	31	74	Hindi
21	male	6	1	3	85	161	Spanish
22	male	6	1	1	84	160	Spanish
23	female	7	1	4	122	214	Spanish
24	female	8	2	0	70	82	Hindi
25	male	7	2	1	22	27	Spanish
26	female	7	2	0	45	168	Arabic

Based on the above results, it can be said computer-aided instruction is beneficial for young ESL students. CAI has many academic applications, especially with ESL students. While the idea of CAI is not new, the ability to utilize instruction on computers has never been better. By using the computer in the classroom, teachers have yet another resource that appeals to most students. There is more uniformity in operations systems and in the units themselves. Educational software is abundant and educational websites abound. Computer-aided instruction is more easily implemented than ever before. Computer-assisted instruction aids teachers in meeting the needs of diverse learners, in particular ESL students. Using computers to assist ESL students learn basic sight words is effective and enhances motivation.

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