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EXECUTIVE SUMMARY

ADAPTATION OF EGRA TO SPANISH AND K'ICHE': THE GUATEMALAN EXPERIENCE

ELGI: Evaluación de Lectura para Grados Iniciales

EESNAJ: Etab'al Etamab'al rech Sik'inem wuj pa ri Nab'e taq Junab'

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USAID EDUCATION REFORM IN THE CLASSROOM

Adaptation of EGRA to Spanish and K'iche':
The Guatemalan Experience

Executive Summary

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Executive Summary

1. Introduction

This document summarizes the process of adapting and piloting Reading EGRA to Spanish (ELGI) and to K'iche' (ESNAAJ). A comprehensive report is available upon request from USAID/G or from the first author.

Comprehension is one of the most important skills that should be acquired in early grades, given that many of the other skills that students will develop, along their academic life, are related to it.

However, the results of national assessments, carried out by the Directorate of Evaluation and Educational Research (DIGEDUCA) of the Ministry of Education of Guatemala, have constantly shown that the reading skills of early grade students is below of what is stated in national educational standards, particularly for those studying in public schools.

In 2006, 60.15% and 66.5% of 1st and 3rd grade students failed to achieve the expected reading performance level (Cruz & Santos, 2013). Although the results for 2010 appeared more promising, still 52.49% of 1st graders and 48.29% of 3rd graders failed to achieve the national reading standards (Cruz & Santos, 2013). This implies that students are not acquiring the basic skills that allow them to learn complex tasks and face future life situations that require adequate literacy skills.

Due to the above and as it is considered important that the Ministry of Education continues to have evidence based information about the acquisition of literacy in the early grades, the USAID/Education Reform in the Classroom Project adapted EGRA to Spanish (ELGI; Evaluación de Lectura para Grados Iniciales) and K'iche' (EESNAJ; Etab'al Etamab'al rech Sik'inem wuj pa ri Nab'e taq Junab').

2. EGRA adaptation to Spanish and K'iche'

EGRA was first adapted to Spanish (ELGI) and afterwards to K'iche' (EESNAJ). Specialists from DIGEDUCA and the Directorate of Bilingual Intercultural Education (DIGEBI), both from the Ministry of Education of Guatemala, were involved throughout the adaptation process.

When adapting a test it is important not to introduce construct, method or item bias and therefore it cannot consist in a solely translation (Hambleton, Merenda, & Spielberger, 2005). Thus, the first step taken was to review those aspects related to language structure differences between English, Spanish, and K'iche'. One advantage for the adaptation process was that Spanish and K'iche' are languages with transparent orthographies, meaning that there is high phoneme-grapheme correspondences.

Subsequently, the construct of the five components of EGRA were reviewed, in order to discern how these should be evaluated in Spanish. This was done following the procedures appearing in the EGRA Assessment Toolkit in Spanish (RTI International, 2009) and EGRA adaptation experiences in other countries.

A relevant difference was found in one of the approaches by which EGRA measures phonemic awareness, namely phoneme segmentation. Due to differences between the acquisition of English and Spanish, some unique processes take place between children who learn to read in Spanish and those who learn to read in English. Hence, the approach of phoneme segmentation was not included in ELGI. Only the initial sound identification approach was included, which has shown to be a good predictor of phonemic awareness in Spanish (Herrera & Defior, 2005).

The adapted components of ELGI served as a basis for reviewing the construct for K'iche'. Reviewing the construct was important, since it has to be guaranteed that both of the tests measure the same construct under the same evaluation method.

Once the constructs were reviewed, the items specifications for ELGI and EESNAJ were created. The items of ELGI were developed by test specialists from USAID/Education Reform in the Classroom and DIGEDUCA, while the items of EESNAJ were developed by bilingual specialists from DIGEDUCA and DIGEBI, who had K'iche' as mother tongue and experience in Linguistics as well as in item development.

It is important to point out that the development of the items specifications for EESNAJ represented a challenge since there is not much information about the vocabulary universe of K'iche'. This called for an analysis of documents (textbooks, laws pertaining to the Mayan languages alphabet creation, didactic materials, and research) and expert advice. The documents used for creating the items specifications were: (a) textbooks in K'iche' developed by DIGEBI along three decades, (b) a sociolinguistic research about vocabulary and phonetic universe of K'iche' language (Universidad Rafael Landívar, 2006), and (c) a document about the pronunciation of the new official alphabets (Instituto Indigenista Nacional, 1988).

After the pilot studies two main modifications were made to the preliminary items specifications of *Letter name knowledge*, *Letter sound knowledge*, and *Phonemic awareness* subtests.

The subtests of *Letter name knowledge* and *Letter sound knowledge*, for both ELGI and EESNAJ, were divided in two sections. The letters of the first section are ordered according to the phoneme frequency of the oral and written corpus of Spanish and oral corpus of K'iche'. The second section includes letters organized at random and according to the phoneme frequency of the oral and written corpus of Spanish and oral corpus of K'iche'.

In ELGI, *Phonemic awareness* was measured by initial sound and initial syllable identification. Since no relationship was found between the latter and the abilities of decoding and fluency, it was removed from the *Phonemic awareness* subtest.

3. ELGI: Pilot studies[1] and Results

Two pilot studies were carried out. The first one took place in May-June 2010 in three schools, two public and one private, located in the department of Guatemala. The second pilot study was carried out in September 2010 in 22 public schools located in nine municipalities of three departments, namely: Chiquimula, Guatemala, and Jalapa. Only the results of the second pilot study are reported.

3.1 Sample

Four hundred and fourteen second grade students, randomly selected, participated in this pilot study. From these students, 56% (231) were girls. The average age was 9 years (*S.D*=1), ranging from 7 to 16. Most of the students (405; 98%) reported Spanish as their mother tongue. Twenty-six percent (106) of the students studied in a multigrade classroom, mainly from Chiquimula (48; 45%) and Jalapa (58; 55%). Only 13% (54) of students were repeaters, who were mainly from Chiquimula (21; 39%) and Jalapa (23; 43%).

[1] DIGEDUCA carried out a pilot study with a nationally representative sample. The results will be available in the current year.

3.2 Items internal consistency

Cronbach's alpha coefficient was calculated, for each one of the subtests, in order to know the internal consistency of the items making them up. The results showed that they are closely related, suggesting that the subtests are accurate and reliable (Cohen in Morales, 2008). The coefficients ranged from 0.778 to 0.998.

Table 1: ELGI: Internal consistency of subtests

Subtest	*Cronbach's alpha*	*No. items*
1.1 Letter name knowledge, ordered by freq. in oral corpus	0.914	30
1.2 Letter name knowledge, at random order	0.979	100
2.1 Letter name knowledge, ordered by freq. in oral corpus	0.978	30
2.2 Letter sound knowledge, at random order	0.980	100
3. Phonemic awareness: Initial sound identification	0.874	10
4. Familiar Word reading	0.975	50
5. Pseudo word reading	0.955	50
6. Passage Listening comprehension, in Spanish	0.778	6
7. Passage reading	0.988	100
8. Passage comprehension	0.849	7
9. Dictation	0.864	6

3.3 Results

The results obtained by students in each one of the subtests are shown in the following table.

Table 2. ELGI: Subtests results

Subtest	***Mean***	***S.D***	***Mín***	***Max***	***n***
1.1 Letter name knowledge, ordered by freq. in oral corpus	27	5	0	30	414
1.2 Letter name knowledge, at random order	65	21	0	130	411
2.1 Letter name knowledge, ordered by freq. in oral corpus	12	11	0	30	414
2.2 Letter sound knowledge, at random order	25	18	0	97	290
3. Phonemic awareness: Initial sound identification	6	3	0	10	414
4. Familiar Word reading	45	19	0	100	410
5. Pseudo word reading	31	12	0	70	411
6. Passage Listening comprehension, in Spanish	4	2	0	6	414
7. Passage reading	73	30	0	158	408
8. Passage comprehension	5	2	0	7	414
9. Dictation	10	3	0	12	414

Those students who in less than a minute read all of the items correctly obtain higher scores in the following subtests: *1.2 Letter name knowledge*, *2.2 Letter sound knowledge*, *Familiar Word reading*, *Pseudowords reading*, and *Passage reading*. That is why the scores appearing in these subtests are higher than the number of items that make them up.

The results section of the complete report (Rubio, Perdomo, & Magzul, 2014) includes, additionally to the detailed results for each one of the subtest, an analysis of variance (ANOVA) for independent samples. The analysis provides information about whether mean differences among two or more groups were statistically significant. The groups taken into consideration are those

that had been found to be relevant in literacy skills acquisition (Del Valle, 2012, p. 28), namely: department, gender, multigrade classroom, and grade repetition.

3.4 *Passage comprehension* predictors

A linear regression analysis was performed in order to know which subtests predict *Passage comprehension*. The results are shown in the following table.

Table 3: ELGI: *Passage comprehension* predictors

Subtest	*B*	*Std.error*	*t*	sr^2 [2]
Intercept	-0.230	0.658	-0.350	
1.1 Letter name knowledge, ordered by freq. in oral corpus	0.024	0.027	0.893	0.001
1.2 Letter name knowledge, at random order	-0.010	0.006	-1.689	0.005
2.1 Letter name knowledge, ordered by freq. in oral corpus	-0.012	0.016	-0.765	0.001
2.2 Letter sound knowledge, at random order	0.009	0.008	1.092	0.002
3. Phonemic awareness: Initial sound identification	0.055	0.047	1.189	0.003
4. Familiar Word reading	-0.004	0.009	-0.472	0.000
5. Pseudo word reading	0.019	0.015	1.259	0.003
6. Listening comprehension, in Spanish	**0.397*** **	0.060	6.664	0.079
7. Passage reading	**0.021*** **	0.006	3.525	0.022
8. Dictation	**0.165*** **	0.048	3.404	0.020

***$p < 0.001$; R=0.710, R^2=0.505

The overall regression model was statistically significant [F(10, 279)=28.422; p<0.001]. Thus, *Passage comprehension* could be predicted at levels significantly above chance from scores on the ten subtests.

When the ten subtests were used as predictors, about 50.5% (R^2=0.505) of the variance in *Passage comprehension* could be predicted. *Listening comprehension* [t(279)=6.664; p<0.001], *Passage reading* [t(279)=3.525; p<0.001], and *Dictation* [t(279)=3.404; p<0.001] were found to be statistically significant predictors of *Passage comprehension*.

Listening comprehension was the subtest that explained most of the variance in *Passage comprehension* when the other subtests were statistically controlled. About 7.9% of the variance in *Passage comprehension* was uniquely predictable from *Listening comprehension*. The positive slope for *Listening comprehension* as a predictor of *Passage comprehension* indicated that there was about 0.397-point increase in *Passage comprehension* for each 1-point increase in *Listening comprehension*.

Passage reading also uniquely predicted about 2.2% of the variance in *Passage comprehension* when the other subtests were statistically controlled. There was about 0.021-point increase in *Passage comprehension* for each 1-point increase in *Passage Reading*.

Finally, *Dictation* uniquely explained about 2% of the variance in *Passage comprehension,* when the other subtests were statistically controlled. There was about 0.165-point increase in *Passage comprehension* for each 1-point increase in *Dictation*.

[2] The square semipartial correlation estimates how much of the variance in the dependent variable (*Passage comprehension*) is uniquely predictable from each independent variable (ten subtests) (Warner, 2008, p. 449).

4. EESNAJ: Pilot studies and Results

Three pilot studies were carried out. All of them took place in public schools located in the department of Quiché and according to the Ministry of Education records and personnel from Departmental Directorates of Education (DIDEDUC) these were bilingual. The first pilot study was carried out in May 2010 in a rural school located in Santo Tomás Chichicastenango. In June 2010, the second pilot study took place in a rural school of Santa Cruz del Quiché. Finally, the third pilot study was carried out in 23 schools locales in Joyabaj and San Pedro Jocopilas. Only the results of the third pilot study are reported.

4.1 Sample

Five hundred and twenty second grade students, randomly selected, participated in this pilot study. From these students, 58% (300) were boys. The average age was 10 years (*S.D*=1), ranging from 7 to 15. Most of the students (510; 98%) reported K'iche' as their mother tongue. Eight percent (44) of the students studied in a multigrade classroom; 70% (31) were from Joyabaj. According to what students reported, 35% (181) were repeating the grade, being most of them from Joyabaj (131; 72%). From the 32 teachers, 75% (24) mention K'iche' as their mother tongue.

The books that children reported for learning to read were classified in three categories, namely: (a) books specifically designed for teaching to read, (b) story books, and (c) others. According to the results, the majority (354; 70%) learn to read using books specifically designed for teaching to read, being *Victoria* the one that most of them used (306; 86%). It is important to notice *Victoria* is a book designed for teaching t oread in Spanish.

4.2 Items internal consistency

Cronbach's alpha coefficient was calculated, for each one of the subtests, in order to know the internal consistency of the ítems making them up. The results showed that they are closely related, suggesting that the subtests are accurate and reliable (Cohen in Morales, 2008). The coefficients ranged from 0.426 to 0.973. The only exception was found for *Passage comprehension* subtest. The coefficient magnitude was small (Morales, 2008).

Table 4: EESNAJ: Internal consistency of subtests

Subprueba	*Cronbach's alpha*	*No. items*
1.1 Letter name knowledge, ordered by freq. in oral corpus	0.890	10
1.2 Letter name knowledge, at random order	0.973	100
2.1 Letter sound knowledge, ordered by freq. in oral corpus	0.894	10
2.2 Letter sound knowledge, at random order	0.967	99
3. Phonemic awareness: Phoneme segmentation	0.927	10
3.1 Phonemic awareness: Initial sound identification	0.755	10
4. Familiar Word reading	0.933	47
5. Pseudo word reading	0.946	50
6. Listening comprehension, in K'iche'	0.426	5
7. Passage reading	0.954	60
8. Passage comprehension	0.377	5
9. Dictation	0.778	6

4.3 Results

The results obtained by students in each one of the subtests are shown in the following table.

Table 5: EESNAJ: Subtests results

Subprueba	***Mean***	***S.D***	***Min***	***Max***	***n***
1.1 Letter name knowledge, ordered by freq. in oral corpus	7	3	0	10	520
1.2 Letter name knowledge, at random order	33	17	0	99	508
2.1 Letter sound knowledge, ordered by freq. in oral corpus	7	3	0	10	520
2.2 Letter sound knowledge, at random order	30	16	0	95	520
3. Phonemic awareness: Phoneme segmentation	28	10	0	35	520
3.1 Phonemic awareness: Initial sound identification	8	2	0	10	520
4. Familiar Word reading	14	9	0	44	504
5. Pseudo word reading	18	11	0	54	504
6. Listening comprehension, in K'iche'	4	1	0	5	520
7. Passage reading	19	10	0	60	499
8. Passage comprehension	0	1	0	4	520
9. Dictation	6	3	0	12	520

Those students who in less than a minute read all of the items correctly obtain higher scores in the following subtests: 1.2 Letter name knowledge, 2.2 Letter sound knowledge, Familiar Word reading, pseudo words reading, and Passage reading. That is why the scores appearing in these subtests are higher than the number of items that make them up.

Likewise ELGI, the results section of the complete report (Rubio, Perdomo, & Magzul, 2014) includes the detailed results for each one of the subtest and an analysis of variance (ANOVA) for independent samples. The groups taken into consideration for the analysis were: municipality, gender, multigrade classroom, and grade repetition.

4.4 *Passage comprehension* predictors

A linear regression analysis was performed in order to know which subtests predict *Passage comprehension*. For the analysis, only the subtests that were statistically significantly correlated with *Passage Comprehension* were taken into account. The following data is preliminary and thus requires a careful interpretation. As it was mentioned before, the results of the Cronbach's alpha coefficient for *Passage comprehension* was small and therefore its reliability and accuracy might be unstable.

Table 6: *Passage comprehension* predictors

Subtest	*B*	*Std. error*	*t*	sr^2 [3]
Intercept	-0.056	0.121	-0.465	
1.1 Letter name knowledge, ordered by freq. in oral corpus	**-0.053*** **	0.009	-6.237	0.060
1.2 Letter name knowledge, at random order	0.002	0.002	0.943	0.001
2.2 Letter sound knowledge	0.003	0.002	1.775	0.005
3. Phonemic awareness: Phoneme segmentation	0.002	0.003	0.768	0.001
3.1 Phonemic awareness: Initial sound identification	-0.007	0.013	-0.516	0.000
4. Familiar Word reading	0.004	0.006	0.657	0.001
5. Pseudo word reading	-0.005	0.005	-1.114	0.002
6. Listening comprehension	0.039	0.020	1.922	0.006
7. Passage reading	**0.023*** **	0.004	5.794	0.052
8. Dictation	-0.002	0.010	-0.173	0.000

***$p < 0.001$; R=0.510, R^2=0.260

The overall regression was statistically significant [F(10, 478)=16.824; p<0.001]. Thus, *Passage comprehension* could be predicted at levels significantly above chance from scores on the ten subtests.
When the subtests were used as predictors, about 26% (R^2=0.510) of the variance in *Passage comprehension* could be predicted. Only two subtests were found to be statistically significant predictors of *Passage comprehension*, namely: *1.1 Letter name knowledge* [t(478)= -6.237; p<0.001] and *Passage reading* [t(478)= 5.794; p<0.001].

The subtest *1.1 Letter name knowledge* uniquely predicted about 6% of the variance in *Passage comprehension* when the other subtests were statistically controlled. The negative slope for *1.1 Letter name knowledge* as a predictor of *Passage comprehension* indicated that there was about 0.053-point decrease in *Passage comprehension* for each 1-point increase in *1.1 Letter name knowledge*.

Passage reading uniquely explained about 5.2% of the variance in *Passage comprehension*, when other subtests were statistically controlled. There was about 0.023-point increase in *Passage comprehension* for each 1-point increase in *Passage reading*.

5. Conclusions

1. **The presentation of the letters in the frequency order of the oral corpus impacts on the item index difficulty:** In order to investigate if letter ordering had any influence and to select the most adequate item, two types of items were developed for *Letter name knowlegde* and *Letter sound knowledge*, for both ELGI and EESNAJ.
    a. ELGI: Form **A** included letters organized at random and according to the phoneme frequency of the oral and written corpus of Spanish, whereas Form **B** included letters ordered according to the phoneme frequency of the oral and written corpus of Spanish. Results showed that the item consisting of letters ordered according to the

[3] The square semipartial correlation estimates how much of the variance in the dependent variable (*Passage comprehension*) is uniquely predictable from each independent variable (ten subtests) (Warner, 2008, p. 449).

phoneme frequency were easier than when letters were organized randomly. Hence, the final version of the test is divided in two sections.

i. The first section (1.1 y 2.1) includes 30 letters ordered according to the phoneme frequency of the oral and written corpus of Spanish.
ii. The second section (2.1 y 2.2) includes 100 letters organized at randome and according to the phoneme frequency of the oral and written corpus of Spanish.

b. EESNAJ: Form **A** included letters organized according to the phoneme frequency presented in the research study carried out by the Linguistics Institute of Universidad Rafael Landívar (URL), whereas Form **B** included letters ordered according to first grade textbook of K'iche' developed by DIGEBI. The item included in Form **A** was easier to second grade students in both pilot studies. Therefore, the final version of the test is divided in two sections.

i. The first section (1.1 y 2.1) includes 10 letters ordered according to the phoneme frecuency of the oral corpus of K'iche'.
ii. The second section (2.1 y 2.2) includes 100 letters organized randomly and according to the frequency of the oral corpus of K'iche'.

2. **The subtests tapping letter sound knowledge –alphabetic principle- were more difficult for the students, both in Spanish and K'iche'.**

a. ELGI: *Letter sound knowledge* subtest was the most difficult for students ($M_{S2.1}$=12; $S.D_{S2.1}$=11; $M_{S2.2}$=25; $S.D_{S2.2}$=18), followed by *Pseudo words reading* (*M*=31; *S.D*=12).

a. EESNAJ: The average for *Letter name knowledge* and *Letter sound knowledge* was 33 (*S.D*=17) and 30 (*S.D*=16), respectively. Students read on average 14 (*S.D*=9) familiar words and decodified on average 18 (*S.D*=11) pseudo words.

The results for *Pseudo word reading* support the explanation given by academics about written word identification. When a person reads words that are not in his/her memory "he/she translates the orthographic elements to its corresponding phonemic form" (Jiménez, 2009, p. 15), whereas he/she reads words included in his/her memory, these are automatically read. This might explain why students read on average fewer pseudo words than the ones they read on average for *Familiar Word reading* and *Passage reading*.

3. **Students have listening comprehension by the time they come to school:** For both ELGI and EESNAJ, *Listening comprehension* was an easy subtest for students.
4. **For ELGI, the results of *Dictation* suggest that second grade students know letter trace and have acquired the alphabetic principle.** This results evidence what Jiménez (2009) posits "…the skill of students to listen sounds and correctly write letters and words according to the sounds they listen, proves the successful acquisition of the alphabetic principle."
5. **Usage of syllables is not important for ELGI**: no relationship was found between initial syllable identification and the abilities of decoding and fluency. Therefore, it was removed from the *Phonemic awareness* subtest.
6. **For EESNAJ, the subtests measuring *Phonemic awareness* were difficult for students.** The average of sounds given by students for *Phonemic awareness: Initial sound identification* was 28 (*S.D*=10), whereas for *Phonemic awareness: Phoneme segmentation* the average sounds given by students was 8 (*S.D*=2).
7. **Several associated factors impact on students' performance:** The factors associated to literacy acquisition that were consistently found to explain the statistically significant differences of ELGI and EESNAJ subtests were place of residence (department, municipality), grade repetition, and multigrade classroom.

8. **No all ELGI and ESNAAJ subtests predict reading comprehension:** The regression analysis showed that three subtests of ELGI and two subtests of EESNAJ significantly predicted *Passage comprehension*.
    a. ELGI: The best predictor was *Listening comprehension*, followed by *Passage reading* and *Dictation*.
    b. EESNAJ: The subtests that predicted *Passage comprehension* were *Passage reading* and *1.1 Letter name knowledge*. Given that the results of the Cronbach's alpha coeffient for *Passage comprehension* was small and therefore its realibility and accuracy might be unstable, results of the regression analysis should be interpreted carefully.

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