SKYPE® INTERNATIONAL EFL EXCHANGES REVISITED: CHI-SQUARED RESULTS OF CHANGES IN AFFECTIVE VARIABLES

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Abstract

This article contains the results of a chi-squared analysis on the data set of a survey instrument completed by a class of Japanese elementary school students (n = 29) before and after a series of Skype® exchanges. The parametric results were reported previously (Ockert, 2015a). The instrument instructions requested students to rank six statements on a scale from 1 (*Completely Disagree*) to 6 (*Completely Agree*). Comparing the chi-squared individual item results before and after the exchanges clearly shows the increases in the affective variables across the range of the scale numerical options. The implications for the use of voice over Internet protocol technologies in EFL contexts are discussed.

Keywords: Affective variables; chi-square analysis; EFL; Japan; motivation; Skype®

1. Introduction

This article is a follow-up to a previously published article in this journal (Ockert, 2015a), which provided the parametric results. Readers interested in specific details regarding the content of the Skype® exchanges, etc., are encouraged to read the previous articles (Ockert, 2015a, 2015b). However, this article is written as a reply to a professional critique by Ferreira (2017). The author chose to delve deeper into the data set utilizing a chi-square ($\chi 2$) analysis, a non-parametric analytical method appropriate for small-sample sizes. It can be reasonably assumed that the $\chi 2$ analysis may show increases in the pre- and post-intervention survey option choices. In other words, the $\chi 2$ results will show increases when comparing the pre-intervention with the post-intervention survey results on a per item basis – results that a simple mean / standard deviation increase does not reveal.

The use of the Skype video-conferencing technology in educational contexts in general (e.g. Sivakumar, 2015) and foreign language (FL) learning contexts continues to increase for several reasons. For example, research "findings provide evidence that Skype® is beneficial and effective for the teaching and learning of English" (p. 20), according to Raman and Krishnasamy (2015). Also, and in support of the abovementioned practical applications,

research has revealed statistically significant positive increases in changes on a self-report measure before and after EFL Skype® language exchanges (Ockert, 2015a, 2015b, 2017a, 2017b).

The use of a χ2 analysis goodness-of-fit will show the extent to which the numerical choices of the participants in the survey vary from the mode before and after the Skype® exchanges. Furthermore, and of particular value for this study, we will be able to see how the numerical choices changed after the exchanges in comparison with the results reported before the exchanges. These results are of immediate relevance for teachers since they can see clearly how the students' affect was positively influenced as a result of the exchanges. The results presented in this article are of particular significance in light of the fact that other studies in the Japanese EFL (JEFL) context have shown that Skype® is increasing in popularity. As a result, researchers in the JEFL schools are working to develop scales to measure the impact of Skype® use on skills gained from research studies – such as the one reported on in this article (e.g. see Tabira & Goto, 2017).

For review of the positive results reported in the earlier article, please see Table 1, which has the parametric results (Ockert, 2015a). As can be seen, the results are mostly positive, with only a single non-statistically significant reduction in Communicative Confidence. For the purpose of review, the results of the differences for the groups' mean (*M*) and standard deviation (*SD*) before and after the intervention are presented in Table 1 (Ockert, 2017a, 2017b) for reference. Also, the six items on the survey instrument are intended to measure interest in foreign language activities, international posture, motivation, communicative confidence, willingness to communicate (WTC), and the desire to travel abroad (Please see the Appendix).

Table 1. The experimental groups' *M* and *SD* before and after the intervention

	Foreign Lang. Activities	International Posture	Motivation	Comm. Confidence	Willingness to Comm.	Desire to Travel
Before	3.14 (1.70)	3.31 (1.84)	3.17 (1.70)	3.45 (1.40)	3.34 (1.86)	4.45 (1.77)
After	4.10 (1.16)	4.48 (1.10)	4.10 (1.16)	3.41 (1.38)	3.90 (1.24)	5.07 (1.14)
Difference	0.96**	1.17**	0.93**	-0.04	0.56	0.62*
Effect Size	0.83	1.06	0.80	*Na*	*Na*	0.54
Power	.77	.95	.74	*Na*	*Na*	.65

Note. **$p < .01$; *$p < .05$

These results clearly show positive and meaningful increases in four of the six variables investigated. However, the results in this article are from a χ2 test that examines the goodness-of-fit of the data from the instrument results before and after the Skype® interventions. For the

$\chi 2$, the lower score indicates similarity of response between the items. For the $\chi 2$, a lower number indicates the responses are, in general, closer to the mode, which is the anticipated number of responses to each of the six numerical choices. Therefore, the results presented herein confirm that the Skype® student affect increases are not only positive, but meaningfully different than the control group, as shown in the previous study (Ockert, 2015a).

2. The affective variables under investigation

As mentioned above, six affective variables related to EFL learning are examined in this study. They are foreign language activities (FLAs), motivation, international posture (IP), willingness to communicate (WTC), communicate confidence (CC) and desire to travel overseas. These six variables were chosen as part of a study for a larger research project, and are not considered to be the only variables impacting EFL learners' language learning outcomes. Our previous research has shown that the Skype exchanges not only showed statistically significant increases (Ockert, 2015a, 2015b) but also had meaningful large effect sizes and statistical power (Ockert, 2017a, 2017b). After a brief review of the six affective variables investigated for the study, the results are presented and discussed. The first variable, foreign language activities may not be an affective variable per se, it will be used in further analysis to detect what, if any, changes they may have on the five remaining affective variables. It is important to note that at least two of the variables, motivation and willingness to communicate, are proven predictors of L2 use in the JEFL context (Hashimoto, 2002).

2.1. Foreign language activities

Previously, Takiguchi (2002) demonstrated the efficacy of in-class videoconferencing interventions with elementary school students in the JEFL learning context. Furthermore, Hiromori's (2006) research has shown that interventions, which stimulate autonomy, competence and need for relatedness, improve student SDT motives in educational context. Also, foreign language activities (FLAs) used in the JEFL context to influence affective variables have included video letter exchanges (Tagami, 2011a; 2011b) and Skype (Ockert, 2015a, 2015b). Therefore, the empirical results of VoIP language exchange interventions as reported in the literature show that affective variables have been positively influenced in previous tech-based interventions in the JEFL context. The research presented in this article confirms this fact.

In the previous article (Ockert, 2015a), the results for FLAs increased from 3.14 (1.70) before the Skype® interventions, to 4.10 (1.16). This increase of 0.96 is statistically significant ($p < .01$). By examining the specific distribution of the answer choices in Table 4, we can see just where the increases occurred.

2.2. International posture

Reporting on research conducted within the JEFL context, Yashima (2000) found that English seems to represent something broader than people from the US or Britain in the minds of young Japanese learners. She refers to a generalized international posture (IP) as an interest in international affairs, willingness to travel abroad and to interact with intercultural partners, and an open-minded attitude toward different cultures. Therefore, this identity with 'foreignness' possesses an international outlook and the attendant attitudes to different cultures and foreigners that are non-Japanese (Yashima, Zenuk-Nishide, & Shimizu, 2004). This work has been the basis for examining the relationships among IP, L2 learning motivation, and communicative confidence in an L2.

The IP mean score increased from 3.31 (1.84) before, to 4.48 (1.10) after the Skype exchanges – an increase of 1.17 points on the six-point scale; this is the largest increase and statistically significant ($p < .01$; Ockert, 2015a). An examination of the individual numerical choices in Table 5 show clearly where the changes are in the six options.

2.3. EFL learner motivation

There have been increases in motivation as a result of computer-mediated communication (CMC) as reported by researchers in previous studies (e.g. Wu, Marek & Yen, 2012). Various reasons are provided; including the result of exposure to stimulating and authentic learning contexts, of collaborative work in a less-threatening environment (Friermouth & Jarrell, 2006), and of learners' perceived feeling of having control over their own learning (Warschauer, 1996). This aspect of CMC motivation will be explored in more detail below and is the basis for the exchange activities used in this study. It is important to explore L2 motivation, as it is a proven predictor of L2 use in the JEFL context (Hashimoto, 2002). Also, a longitudinal study with elementary students demonstrated that student motives were positively influenced by engagement in EFL tasks / activities (Oga-Baldwin & Nakata, 2017; Oga-Baldwin et al., 2017). This is relevant to this research because the use of Skype® in the classroom is clearly a means to engage the students in an FLA with native speakers (NSs) of English.

The results for Motivation as reported in the earlier article showed a mean score increase of 0.93, from 3.17 (1.70) to 4.10 (1.18), which is statistically significant at $p < .01$ (Ockert, 2015a). The results in Table 6 below show exactly where the increases occurred.

2.4. L2 communicative-confidence

MacIntyre and his associates (Donovan & MacIntyre, 2004) identified a concept, which they have labeled 'perceived communicative competence'. In JEFL studies, Yashima (2002) found a positive, causal relationship between motivation (which was comprised of two indicator variables, desire and intensity) and communication confidence (comprised of two indicator variables – communication anxiety, aka nervousness, and perceived communication competence) in the L2, which led to WTC. In addition, Yashima et al. (2004) found that self-confidence in communication in an L2 to be essential to be willing to communicate in that L2. Whatever the context, it is important that earlier studies on public speaking showed that the speaker's perceived competence plays an important role in relation to any attendant anxiety (see MacIntyre & MacDonald, 1998).

The communicative-confidence mean score actually showed a decrease – from 3.45 (1.40) down to 3.41 (1.38) in the previous article (Ockert, 2015a). While this is a very slight drop (-0.04), it was the only affective variable to decline after the exchanges. Possible reasons for this decrease will be discussed below.

2.5. Willingness to communicate

In the JEFL literature, Yashima and her associates (Yashima et al., 2004; Yashima et al., 2009) have conducted research on WTC in the JEFL context in relation to several affective variables, including, language learning orientations and motivations (Yashima, 2000), student WTC (Yashima, 2002) and the influence of attitudes and affect on WTC and second language communication (Yashima et al., 2004); they concluded that self-confidence in communication in a second language is necessary for a learner to be willing to communicate in an L2 (Hashimoto, 2002). Finally, Reinders and Wattana (2011), in a small-scale exploratory study involving student engagement with language via video games ($N = 16$, $n = 8$) found that L2 students who communicated in English in order to play computer games improved their L2 WTC as analyzed via a self-report measure. The results reveal that the average number of turns per student in the third session ($M = 75.88$, $SD = 20.518$) was greater than the first session ($M = 66$, $SD = 18.174$). The results are statistically significant ($t = 3.837$, $p = .006$; $p < .05$) with a medium effect size ($d = 0.49$; p. 14).

In the results reported in the previous article (Ockert, 2015a), WTC showed a non-statistically significant increase of 0.56 after the exchanges; however, there were revealing positive changes, as can be seen in Table 8 below, which will be discussed below.

2.6. Desire to travel overseas

Clément and his associates (see Clément & Krudenier, 1985) reported on the desire to travel overseas and the desire to make friends with members of an L2 target community. Students' desire to spend time abroad is related to instrumental motives (e.g. future employment) and socio-cultural motives such as a desire to make friends (Clément, Dörnyei & Noels, 1994). In an earlier study on computer-mediated communication (CMC), Kramsch and Andersen (1999) wrote that computers and the Internet seem to realize the dream of every language teacher – to bring the language and culture as close and as authentically as possible to students in the classroom. Therefore, using Skype to 'bring the world into the classroom' may increase student interest – and desire to visit – different countries to experience that culture firsthand.

The results for Desire to Travel Overseas increased by 0.62, from 4.45 (1.77) to 5.07 (1.14), which is statistically significant ($p < .05$; Ockert, 2015a). These results – the pre- and post-intervention mean values – are the highest for any of the affective variables. Possible reasons will be discussed below, with reference to the data in Table 9.

3. Methods

3.1. Participants

Twenty-nine 5th grade elementary school students participated in the study ($N = 29$). The students were all either ten or eleven years of age, and evenly divided by gender. They were all native Japanese in the same school in Matsumoto city, Nagano prefecture, Japan.

3.2. Survey instrument

The research project used a self-report measure administered in Japanese. The instrument used a six-point Likert-type scale from 1 (*Completely Disagree*) to 6 (*Completely Agree*). There were six questions, one each on foreign language activities; foreign countries / different cultures; desire to communicate in English; confidence to communicate in English; desire to communicate with foreigners in English and traveling abroad. A principal components analysis (PCA) confirmed the internal validity of the instrument (for more information on the

instrument used, see Ockert, 2015b). Cronbach's *alpha* reliability estimate is .88. The survey was in paper form and in Japanese. Please see Appendix for the six items of the survey.

3.3. Project outline

The survey was administered in class to the students before the Skype® exchanges in April and again in December after the exchanges. During the intervening months, the students participated in three technology-based FLAs (Skype® exchanges) with students living abroad. The first trial exchange took place on July 21, at which time the students were able to introduce themselves. The second and third exchanges took place for approximately thirty minutes each on November 1st and 2nd respectively, and a final exchange took place on December 2nd for about 30 minutes.

The survey was administered in class to the students before the Skype® exchanges in April and again in December after the exchanges. The survey was in paper form and in Japanese. Participation was voluntary with the approval of the school administrators and student anonymity was assured.

3.4. Analytical method

As this is a small-scale study, using ordinal data, the common parametric analytical method using descriptive statistics such as mean (*M*) scores and standard deviations (*SD*) as used in the previous article has been criticized (see Ferreira, 2017). As suggested, a non-parametric $\chi 2$ goodness-of-fit analysis is used in the present study. The advantages of this method are twofold: First, the changes in the $\chi 2$ result itself inform us of the extent to which student responses deviate from the mode; and second, we can examine the specific number of responses to each item for each numerical choice, thereby allowing comparison for before / after the Skype® exchanges.

3.5. Research questions and hypotheses

Based upon the previously reported research results, the following research questions are asked:

1. Will there be increases in the $\chi 2$ results for the post-intervention data?
2. Will the $\chi 2$ output data show changes in the distribution of the student selections of the numerical options that will support the quantitative results in the previous article (Ockert, 2015a)?

Based on the two research questions, the following hypotheses are offered and examined:

1. The post-intervention χ2 results will show increases, indicating less parsimony in the data in overall, with a concentration of results in the higher numerical choices.
2. The post-intervention χ2 tables for the individual items will show results that illuminate the previously reported results in Ockert, 2015a.

The research questions were operationalized with a survey instrument that asked the students to rank the six statements on a Likert-type scale from 1 (*Completely Disagree*) to 6 (*Completely Agree*). Please see the Appendix.

4. Results and findings

The pre-Skype® exchange data for the experimental group were put to a χ2 analysis, and the results are provided in Table 2, and the post-exchange data appear in Table 3. An interesting coincidence is the similarity in the results for FLAs and Motivation before and after the intervention in Tables 2 and 3, respectively. However, this should not be unexpected as the descriptive statistics (*M* & *SD*) are very similar (see Table 1). However, another study to check the content validity of the instrument using a principal components analysis (PCA) confirmed that the items are in fact measuring different constructs, as the individual items neither formed single components nor cross-loaded (Ockert, 2015b). It should also be noted that a review of the data showed that the same students did not select the same numerical choices for the two items.

Table 2. The experimental group χ2 test results before the Skype® exchanges

	Foreign Lang. Activities	**International Posture**	**Motivation**	**Comm. Confidence**	**Willingness to Comm.**	**Desire to Travel**
χ2	1.828[a]	3.241[b]	1.828[a]	12.586[a]	3.069[a]	11.172[b]
df	5	4[c]	5	5	5	4[d]
p level	*p* = .872	*p* = .518	*p* = .872	*p* = .028	*p* = .689	*p* = .025

a. The expected frequency of 6 cells (100.0%) is 5 or less. The minimum value of the required cell frequency is 4.8.
b. The expected frequency of 0 cells (0.0%) is 5 or less. The minimum value of the required cell frequency is 5.8.
c. The *df is* 4 since no participants responded to option 3 on the scale of 1 (completely disagree) to 6 (completely agree).
d. The *df* is 4 since no participants responded to option 2 on the scale of 1 (completely disagree) to 6 (completely agree).

The results presented in Table 3 help confirm that the Skype® student affect result increases are not only positive, but also statistically significant in comparison with the pre-intervention results shown in Table 2 (Ockert, 2017a). The χ2 results in Table 3 also inform us that the respondents are replying to the individual survey items in a more distinct manner. For pre- and

post-intervention comparisons, the results for each of the 6 items are in Tables 4 through 9 below.

Table 3. The experimental group χ2 test results after the Skype® exchanges

	Foreign Lang. Activities	**International Posture**	**Motivation**	**Comm. Confidence**	**Willingness to Comm.**	**Desire to Travel**
χ2	17.552[a]	10.483[b]	17.552[a]	11.345[a]	10.931[a]	19.793[b]
df	5	4[c]	5	5	5	4[c]
p level	*p* = .004	*p* = .033	*p* = .004	*p* = .045	*p* = .053	*p* = .001

a. The expected frequency of 6 cells (100%) is 5 or less. The minimum value of the required cell frequency is 4.8.
b. The expected frequency of 0 cells (0%) is 5 or less. The minimum value of the required cell frequency is 5.8.
c. The *df* is 4 as no participants responded to option 1 on the scale of 1 (completely disagree) to 6 (completely agree).

Furthermore, the high χ2 values in Table 3 inform us that at the very least the students as a group responded to each item in a more 'specific' manner to individual response choices after the interventions, and the low *p* values confirm this. Also, none of the participants chose option 1 for *Completely Disagree* for *IP* and *Desire to travel abroad* – a clear indication that their affect was positively influenced by the Skype® exchanges. However, the most important aspect of these results is that for many of the items, students specifically chose the higher range numerical options (4, 5, & 6) after the exchanges in comparison with the survey results before exchange. For example, as can be seen in Tables 4, 5, 6, 8, and 9, the before results show that the answer choices are rather evenly spread across all numerical options, from 1 (*Completely Disagree*) to 6 (*Completely Agree*). As the χ2 values after the exchanges indicate, the students tended to 'cluster' their responses on the higher three numerical options.

However, since the χ2 results by themselves only inform us that the results differ from the expected mode of an even distribution of results, we can look even further at the distribution of the results before and after the Skype® exchanges to see exactly how the students responded on the scale of 1 to 6. Therefore, any differences – both positive and negative – between the before and after results can be scrutinized for a better understanding of the clearly positive influence of the intervention.

4.1. Foreign language activities

As can be seen in Table 4, the distribution of answers around the mode is quite parsimonious before the exchanges (on the left side of the Table) compared with after the exchanges (right side of Table).

Table 4. The Foreign Language Activities results before and after Skype® exchanges

	Foreign Language Activities Before				Foreign Language Activities After		
	Observed frequency *N*	**Expected frequency *N***	**Residual Error**		**Observed frequency *N***	**Expected frequency *N***	**Residual Error**
1.00	7 (24%)	4.8	2.2	1.00	1 (3%)	4.8	-3.8
2.00	5 (17%)	4.8	.2	2.00	2 (7%)	4.8	-2.8
3.00	5 (17%)	4.8	.2	3.00	4 (14%)	4.8	-.8
4.00	4 (14%)	4.8	-.8	4.00	10 (34%)	4.8	5.2
5.00	5 (17%)	4.8	.2	5.00	10 (34%)	4.8	5.2
6.00	3 (10%)	4.8	-1.8	6.00	2 (7%)	4.8	-2.8
Total	29			Total	29		

Of particular interest, 7 students chose option '1' before the Skype® interventions, but this number dropped to 1 student after the interventions. Also, another positive result is the doubling of the positive responses for the '4' and '5' choices.

4.2. International posture

A good example of the positive influence of the intervention(s) is the result of the International Posture data, which is presented in Table 5. These results are particularly impressive in light of the clear fact that 8 students chose option '1' before the interventions, and no students chose this option afterwards.

Table 5. The International Posture results before and after Skype® exchanges

	International Posture Before				International Posture After		
	Observed frequency *N*	**Expected frequency *N***	**Residual Error**		**Observed frequency *N***	**Expected frequency *N***	**Residual Error**
1.00	8 (28%)	5.8	2.2	1.00	0 (0%)	0	0
2.00	5 (17%)	5.8	-.8	2.00	2 (7%)	5.8	-3.8
3.00	0 (0%)	0	0	3.00	2 (7%)	5.8	-3.8
4.00	5 (17%)	5.8	-.8	4.00	11 (38%)	5.8	5.2
5.00	8 (28%)	5.8	2.2	5.00	8 (28%)	5.8	2.2
6.00	3 (10%)	5.8	-2.8	6.00	6 (21%)	5.8	.2
Total	29			Total	29		

Also, the results for the '4' and '6' options either doubled or more. This clearly shows a nice increase of students selecting the top three options (4, 5, & 6) over the lower three numerical choices (1, 2, & 3), as fully 86% of all responses after the exchanges are for the top three options.

4.3. Motivation

Similarly, as Table 6 shows, seven students chose the '1' option before, and only '1' student did so after the interventions. The results for the '4' and '5' choices doubled. Again, this shows a gain on the three highest numerical choices overall.

Table 6. The motivation results before and after Skype® exchanges

	Motivation Before				Motivation After		
	Observed frequency *N*	**Expected frequency *N***	**Residual Error**		**Observed frequency *N***	**Expected frequency *N***	**Residual Error**
1.00	7 (24%)	4.8	2.2	1.00	1 (3%)	4.8	-3.8
2.00	5 (17%)	4.8	.2	2.00	2 (7%)	4.8	-2.8
3.00	4 (14%)	4.8	-.8	3.00	4 (14%)	4.8	-.8
4.00	5 (17%)	4.8	.2	4.00	10 (34%)	4.8	5.2
5.00	5 (17%)	4.8	.2	5.00	10 (34%)	4.8	5.2
6.00	3 (10%)	4.8	-1.8	6.00	2 (7%)	4.8	-2.8
Total	29			Total	29		

Options '4' and '5' doubled in frequency of selection after the exchanges compared with the results before the Skype® intervention(s).

4.4. Communicative confidence

In Table 7, the results for CC show very little difference in the before and after results. While the number of students who chose a '6' doubled, it was only from one student to two students. However, if we look at the number of students who opted for the lowest three choices, there were 16 respondents before the intervention and 13 after the exchanges, which is an improvement.

Table 7. The Communicative Confidence results before and after Skype® exchanges

	Communicative Confidence Before				Communicative Confidence After		
	Observed frequency *N*	**Expected frequency *N***	**Residual Error**		**Observed frequency *N***	**Expected frequency *N***	**Residual Error**
1.00	4 (14%)	4.8	-.8	1.00	4 (14%)	4.8	-.8
2.00	2 (7%)	4.8	-2.8	2.00	3 (10%)	4.8	-1.8
3.00	10 (34%)	4.8	5.2	3.00	6 (21%)	4.8	1.2
4.00	4 (14%)	4.8	-.8	4.00	11 (38%)	4.8	6.2
5.00	8 (28%)	4.8	3.2	5.00	3 (10%)	4.8	-1.8
6.00	1 (3%)	4.8	-3.8	6.00	2 (7%)	4.8	-2.8
Total	29			Total	29		

Thus, while there was an increase in the number of respondents on the top option, many more chose the '4' option than the '5' option after the intervention. The question that should be asked is: Why was there a slight decrease in CC on the self-report measure after the Skype® exchanges? Unfortunately, the results in Table 7 do not reveal very much due to the fact that the difference was minimal.

4.5. Willingness to communicate

The results of the WTC results in Table 8 further demonstrate the influence of the Skype® Exchanges. As can be seen, the number of students who opted for the '1' option was 8 before the exchanges, and only 1 afterwards.

Table 8. The Willingness to Communicate results before and after Skype® exchanges

	Willingness to Communicate Before				Willingness to Communicate After		
	Observed frequency *N*	Expected frequency *N*	Residual Error		Observed frequency *N*	Expected frequency *N*	Residual Error
1.00	8 (28%)	4.8	3.2	1.00	1 (3%)	4.8	-3.8
2.00	3 (10%)	4.8	-1.8	2.00	3 (10%)	4.8	-1.8
3.00	4 (14%)	4.8	-.8	3.00	7 (24%)	4.8	2.2
4.00	4 (14%)	4.8	-.8	4.00	7 (24%)	4.8	2.2
5.00	5 (17%)	4.8	.2	5.00	9 (31%)	4.8	4.2
6.00	5 (17%)	4.8	.2	6.00	2 (7%)	4.8	-2.8
Total	29			Total	29		

This is a large decrease in this numerical choice – and the fact that there are so few indicates that there should logically be a corresponding increase in the other options. These increases appear in the '3', '4', and '5' choices, which is a reversion to the mean. It would have been desirable to see an increase in the '6' choice, but unfortunately this number actually decreased. However, the lowest option was chosen eight times before the exchanges, and only once after the exchanges – a decrease from 28% to 3% after – a clear sign of an increase in WTC.

4.6. Desire to travel abroad

In Table 9, the Desire to Travel Abroad item results are very positive after the Skype® exchanges. Please notice that five students chose the '1' option before the intervention, while no students opted for this choice after the exchanges – from 17% to 0.

Table 9. The desire to travel abroad results before and after Skype® exchanges

	Desire to Travel Abroad Before				Desire to Travel Abroad After		
	Observed frequency *N*	Expected frequency *N*	Residual Error		Observed frequency *N*	Expected frequency *N*	Residual Error
1.00	5 (17%)	5.8	-.8	1.00	0 (0%)	0	0
2.00	0 (0%)	0	0	2.00	2 (7%)	5.8	-3.8
3.00	2 (7%)	5.8	-3.8	3.00	1 (3%)	5.8	-4.8
4.00	2 (7%)	5.8	-3.8	4.00	3 (10%)	5.8	-2.8
5.00	10 (34%)	5.8	4.2	5.00	10 (34%)	5.8	4.2
6.00	10 (34%)	5.8	4.2	6.00	13 (45%)	5.8	7.2
Total	29			Total	29		

Also, there were 10 students who chose a '6' before the exchanges, yet 13 students chose it after them. This is the highest number / percentage of any numerical choice of any of the items.

Clearly, after reviewing all of the results – including the parametric *Mean* change increases, effect sizes, statistical power, and the non-parametric χ2 results, the students' affect was improved as a result the Skype® intervention.

5. Discussion

As mentioned above, the author proposed two research questions. The first, *Will there be increases in the χ2 results for the post-intervention data?* can be answered by simply observing the results in Table 3 and comparing them to the results in Table 2. The answer to this question is 'yes' for all of the items with the exception of CC.

The second question, *Will the χ2 output data show changes in the distribution of the student selections of the numerical options that will support the quantitative results in the previous article (Ockert, 2015a)?* can be positively answered since the results in Tables 4, 5, 6, 8, and 9 all show a decrease in the lowest options, which resulted in increases in the three highest numerical choices.

Based on the research questions, two hypotheses were offered. Hypothesis 1, *The post-intervention χ2 results will show increases, indicating less parsimony in the data in overall, with a concentration of results in the higher numerical choices*, has been shown to be true for FLAs, IP, Motivation, WTC, and Desire to Travel Abroad – all of the items except CC – in Table 3 compared with the results presented in Table 2. This indicates less parsimony in the data overall in comparison with the pre-intervention results. Hypothesis 2, *The post-intervention χ2 tables for the individual items will show results that illuminate the previously reported results in Ockert, 2015a*, is answered with the data visible in Tables 4, 5, 6, 8, and 9. These data show us exactly where the students responses vary in comparison with the pre-intervention results and provide a clear understanding of why there were increases in the descriptive statistics provided in Table 1.

6. Conclusions

Clearly, there are positive implications of the present research for classroom use. While the small-scale study reported on in the current article may not be generalizable to the general EFL population globally, there are certainly compatible opportunities in the JEFL – and similar contexts – and any similar studies would be most welcome. There are, however, several aspects of such exchanges that must be taken into account before engaging in them. The first, of course, is the time involved to set them up, which includes finding a teacher and student group willing to participate in such an intervention. Second, securing the permission from school

administrators is also time consuming. The privacy rights of students must be also taken into consideration.

Despite positive results, there are, however, limitations to the present study. For example, it would have been better to keep a direct track of each participant before and after the intervention, as this would have allowed individual specific comparisons in a pre-post experimental study. However, the results presented herein clearly show positive changes in the numerical selection of the answer choices. However, the $\chi 2$ result tables allow us to see exactly where these positive increases occurred. Another shortcoming of the present study is the lack of qualitative results. The students who chose either of the top two choices did respond in writing as to why they made that choice. The results will be reported in a future paper.

Therefore, based on the results herein – including the descriptive statistics – the author firmly believes that the increases were due to the Skype® exchanges.

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Appendix

English translation of the questionnaire items using a six-point Likert-type scale from1 (*Completely Disagree*) to 6 (*Completely Agree*).

1. I like foreign language (English) activities.
2. I want to know more about foreign countries (different cultures).
3. To communicate in English, I want to study more.
4. I have confidence to communicate using simple English.
5. For myself, I want to communicate with foreigners in English.
6. I want to go overseas at some time.