Visual Thinking Strategies:

Exploring Artwork to Improve Output in the L2 Classroom

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Abstract: The goal of this study was to elicit greater quantity and quality of output in speaking and writing from L2 Spanish students through Visual Thinking Strategies. Previous studies completed in the L1 classroom demonstrate that students exhibit gains when pairing whole-class discussion with writing, thus inspiring this present study. As such, thirty-two Spanish IV (intermediate) students in a rural high school in the United States participated in this study that lasted eight weeks. Control and experimental groups were established to rule out additional variables. Through Visual Thinking Strategies, students in the experimental group discussed authentic artwork on multiple occasions through a teacher-facilitated discussion, followed by individual writing about the piece of artwork. Results of the study showed statistically significant growth among the experimental group in writing through measures of word tokens, word types, word tokens per sentence, and clauses per sentence. Furthermore, very large effect sizes were present. Regarding speaking, data reflect that students in the experimental group greatly outperformed their counterparts in quantity of L2 production as well in words per utterance. These results suggest that Visual Thinking Strategies may be a worthwhile strategy to incorporate into the L2 classroom as way to facilitate students' growth in these areas.
Keywords: Visual Thinking Strategies, Artwork, Foreign Language Learning, Spanish as a Second Language, Output

Introduction

A common problem with intermediate students in the second language (L2) classroom is that they do not feel comfortable communicating in Spanish, despite their ability to perform well on written tests. In addition, students often do not receive many opportunities to write extensively as novice students and are accustomed to responding

to controlled-response writing items rather than responding to prompts requiring extensive answers.

One strategy that may address this concern incorporates art as the medium by which students discuss and share opinions. Visual Thinking Strategies (VTS) are teacher-facilitated, whole-class discussions about a piece of artwork (Yenawine, 2013). While the strategy was developed to be utilized in the first language (L1) classroom, the same concepts can be applied to the L2 environment in order to determine if engaging in whole-class discussion helps language students develop both their written and oral production.

Results from this study are valuable to language teachers as they plan instructional activities for their students, as these results contribute to the knowledge of the utility of Visual Thinking Strategies in the L2 classroom, a strategy that has previously only been used with L1 students. Results provide support for incorporating VTS to foster an environment in which students brainstorm, discuss, defend, and produce ideas in the L2. As such, the present study seeks to better understand in what ways whole-class discussion in the target language benefits learners in their development as measured by these modes of output. While some studies have sought to define the relationship between students' current writing and speaking skills, there is a lack of studies incorporating an intervention that seeks to improve writing through speaking and vice versa. As a result, this study is of value in encouraging teachers to provide their students with more opportunities for output.

Literature Review

To better understand this study, it is important to explore the theoretical basis for the present investigation as well as to more closely examine Visual Thinking Strategies and how this strategy incorporates the theoretical base to language acquisition. Because this study seeks to understand not only the effectiveness of the strategy but also to illustrate

any potential relationship observed between writing and speaking, this literature review reports on previous studies conducted that have shed light on that relationship.

Sociocultural Theory

Vygotsky's sociocultural theory posits that "all learning, including language learning is socially constructed" (as cited in Hosseinpour & Koosha, 2016, p. 497). According to Vygotsky, learners have the opportunity to learn from others through the context of interaction. In L2 acquisition specifically, Hosseinpour & Koosha (2016) maintain that learners have the opportunity to learn from native speakers and other L2 learners as they perform and experiment with language interaction that they would not otherwise be able to do by themselves.

From that interaction, Vygotsky's notion of internalization suggests that those interpersonal processes of interaction become a baseline for development at an intrapersonal level (as cited in Kuhn, Hemberger & Kahit, 2016; van Drie & van de Ven, 2017). In language development, learners try out new language forms and functions in social interactions and later internalize them. Therefore, VanDerHeide (2018) opines that when students participate in whole-class discussions, they internalize their output and how their contribution fits with the larger whole and later use those same moves in their independent writing.

The Importance of Output

An important factor to successful interactions, as mentioned previously, is the necessity to produce output. We turn to Swain (2000) to illuminate the utility of collaborative dialogue and the value of output. Swain describes collaborative dialogue as "knowledge-building" and that it "constructs linguistic knowledge" (p. 97). When students engage in output, they are required to process knowledge more deeply and notice the gaps in their own L2 usage. Output in this form of collaborative dialogue gives students the opportunity to reflect on their own language use, receive input from

others in the dialogue, and negotiate meaning together as they approach a task. Swain states that in collaborative dialogue speakers involved are joined together in problem solving and as a result help each other build and internalize more knowledge in the L2. Taking into account the roles of input and output, Yang (2016) reports on the "output-driven, input-enabled hypothesis" developed by We Quifang. The input given throughout the task enables the L2 learners to appropriately complete the output task at hand. In this hypothesis, output is the driving force to language acquisition, but cannot be completed without adequate input, indicating the intertwined nature of input and output.

An essential aspect of language development is interaction, and output is a necessary component of interaction. Keck, Tracy-Ventura, and Wa-Mbaleka (2006), completed a meta-analysis of studies to find a link between interaction and acquisition, and their data showed that interaction does promote acquisition, with a large effect size. Furthermore, activities that called for pushed output in the activity had a larger effect size than activities that did not incorporate pushed output.

With the ideas presented from these hypotheses and the results from this meta-analysis in mind, the act of engaging in whole-class discussion through Visual Thinking Strategies should be considered an impactful strategy in enhancing students' language use as they are both interacting and producing output in the forms of speaking and writing.

Visual Thinking Strategies

The philosophies of Vygotsky and Swain meet together in the concept of Visual Thinking Strategies. Students interact with one another through whole-class discussions facilitated by the teacher. Yenawine (2013) explains that the teacher limits the questions addressed to students to the following three: What is going on in this picture?, What do you see that makes you say that?, What more can we find?

Throughout the process the teacher points to things the students reference in order to draw their attention, accurately rephrases their comments, and links comments from various students. All these tasks help facilitate the discussion and also validate the ideas of the speakers. Drawing from Vygotsky's theories, according to Yenawine (2013), both the teacher and other peers can serve as more knowledgeable individuals and scaffold language; furthermore, engaging in peer interaction improves students' accuracy and fluency in the target language. Furthermore, Yenawine (2013) makes a claim that would be supported by Swain (2000) in that as students search for words to express themselves, they become aware of what they do not know and as a result reflect on their language use and potentially seek missing information from peers. This collaborative dialogue provided by way of VTS therefore, has the potential to be incredibly effective for students' L2 development.

Originally designed to help museum-goers better understand and process artwork, with its success VTS has become implemented in the educational setting to foster development of critical thinking skills (Yenawine, 2013). An addition to the original strategy was the extension of the whole-class discussion in the form of a writing task. Few reports are available of the use of VTS in L2 classrooms, as it has been used principally in elementary and language arts classrooms; however, allowing students to wonder and imagine about details of artwork seems to be a valuable way to engage them in discovery of the target language. One example of positive growth caused by this strategy took place at Bingham Memorial School. After being trained and evaluating video tapes and journals, teachers observed that students were thinking more deeply, critical thinking skills were transferring into other content areas, and reasoning skills developed through this strategy became evident in student writing samples. Teachers saw students providing evidence, speculating, elaborating on details, interpreting the artwork and defending their opinions, and acknowledging multiple perspectives (DeSantis, 2011). As this strategy calls for a teacher-facilitated

whole-class discussion, the task is primarily student-centered, giving students more opportunity for expression and discovery in the target language.

Affirming the importance of student-centered discussions, Donato and Brooks (2008) conducted a study in a literature discussion which found that when the professor followed a teacher initiation, student response, teacher evaluation model (IRE), student responses were often limited, and the instructor often prohibited further elaboration. Overall, the instructor asked almost completely display and information questions which gave her the floor rather than the students. Therefore, Donato and Brooks call for changing the way instructors lead discussions to allow for student responses and the opportunity to produce language, and VTS allows for exactly that by utilizing a student-centered, whole-class discussion. Also evaluating instructor turns, Thoms (2014) examined the features of teacher-student interaction within whole-class discussion in a college literature course. In order of highest frequency, the teacher used the following reformations of student utterances: access-creating, funneling, and content-enhancing. By allowing affordances for students (students maintaining the floor and being a sympathetic listener), the teacher successfully created and rich and effective learning environment where students could actively learn from one another and through her mediation while being valued as individuals as they explored content and focused on affective communication. A careful and intentional facilitator of VTS creates a similar classroom environment. As Yenawine (2013) has observed over years of seeing implementation of VTS:

> They [students] learn how to learn, how to think, and how to communicate effectively with others. They use expressive experience with words to aid them in writing. Writing is not so much taught as learned, … a useful tool for recording what one thinks and wants to communicate to others. (p. 74)

Overall, VTS seems to have a natural home in the L2 classroom as it promotes authentic practice of the four skill areas of language as well as the three modes of communication: interpretive, interpersonal, and presentational.

Connection Between Oral and Written Production

Yenawine (2013) posits that if students have not had the opportunity to speak extensively, they probably do not possess the ability to write expansively either. He also claims the opposite would be true, therefore, making a reference to the relationship between these two modes of output. While a majority of Yenawine's qualitative research on VTS takes place in L1 classrooms, Hubert (2013) searched for empirical support of the relationship between students' proficiency levels in writing and speaking as measured by the OPI proficiency levels in an L2. Hubert found that the correlation between students' writing and speaking proficiencies was rather low, both at the novice level and advanced levels. Data also showed that students tended to be more proficient in writing than in speaking, so Hubert opined that writing could be utilized to guide students to higher speaking proficiency. While his scope was limited to one university, the information adds to our understanding of this relationship, and as he mentions in his article, researchers in the field of SLA need to more closely study this relationship.

In contrast to the idea that writing would improve speaking, multiple studies show that whole-class discussions, in various formats and contexts, caused students to experience gains in their writing skills. For example, Baralt, Pennestri, and Selvandin (2011) noted in their L2 study that as a result of class discussion about student-created Wordles, students were noticing their errors, and they were later incorporating the correct forms in their writing. From the first composition to the fourth and final composition, the class's total word types had grown from 1,134 to 1,526, a total of 268 words. While their study sought to find a relationship between the visual of the vocabulary through Wordles and increased writing production, the whole-class discussion about Wordles could have also played a role in their study. Another illustration of whole-class

discussion causing improved writing production comes from an L2 study conducted by Hosseinpour and Koosha (2016) who found that there was a positive change in student writing as a result of whole-class discussion. Their intervention had the largest effect size on the quality of content in the writing samples, followed by categories of organization and vocabulary.

While there is not a large body of research on extended-term interventions measuring interaction between writing and speaking, there is a body of research seeking to determine the relationships between L2 learners' abilities in these two modalities in single-day experiments where individuals' production is analyzed in each modality. Supporting the idea that L2 speaking practice improves L2 writing production, Dykstra-Pruim (2003) found that after students completed a writing task, an oral task, and a test on explicit rule knowledge, students performed with higher accuracy on the written task, but they attempted more complex structures in the oral task. Dykstra-Pruim also observed a correlation between explicit rule knowledge and written abilities, but this correlation did not appear when compared with oral abilities. Dykstra-Prium suggests that based on these findings, students should practice orally first because they will likely attempt more language and more complex language orally than they would in writing.

Results from a class of studies looking into measures such as complexity, accuracy, and fluency suggest that making a practice of incorporating both oral and written tasks in the L2 may be beneficial because learners may be stronger in different measures of proficiency according to the mode, and therefore, the two modes may complement one another as useful components of language acquisition. In a small-scale study, Granfeldt (2007) conducted one of the early studies in this area using Swedish L1 speakers learning French as their L2. Subjects completed two oral tasks and two written tasks, and Granfeldt observed that vocabulary diversity was significantly higher in writing than speaking. However, students committed more lexical and grammatical errors in

their written production. Kuiken and Vedder (2011) followed suite with a study on Dutch L1 speakers engaging in their L2, Italian. Overall, they observed that student scores in the written mode seemed to be slightly higher than scores in the oral mode. Fewer errors were made in the oral mode; however, syntactic complexity and lexical variation were higher in the written mode. A similar study conducted by Kormos & Trebits (2012) corroborates this data showing that in the written mode students used more varied vocabulary; however, their results showed students as more accurate in their written production rather than oral production.

Results from a study completed by Vasylets, Gilabert, and Manchón (2017) add more information to the discussion of the relation of the two productive modes. In their study, those completing a written task achieved higher mean length of analysis-of-speech, subordination, lexical diversity, ratio of extended ideas, and time on task. However, in Vasylets, Gilbert, and Manchón's study (2017), those completing an oral task scored higher on overall number of ideas. Furthermore, when the task was more complex, both speakers and writers produced more ideas and longer analysis-of-speech units as well as more sophisticated words. As Vasylets, Gilabert, and Manchón conclude, incorporating oral tasks allow learners to develop their interlanguage in real time while written tasks allow students to process linguistically on a deeper level. Based on these studies of production skills in the L2, asking students to engage in both modes could lead to more enriched and varied practice, allowing their strengths in each mode to benefit the other mode as it develops.

In the general education world, a wider variety of studies have been conducted to better understand the connection between speaking and writing, specifically utilizing whole-class discussion. VanDerHeide (2018) conducted research in an AP Literature course and found that as students engaged in whole-class, teacher-facilitated discussions in which students make claims, provide evidence, and provide commentary, the students incorporated those oral skills into their writing without explicit training. They also

wrote with more commentary, nuance, and fluidity over time, showing high value of classroom talk as it corresponds to writing. Similarly, from whole-class discussions in a high school history class, van Drie and van de Ven (2017) observed that students were reproducing ideas from whole-class discussions in their writings, and longitudinally students also began to transform ideas they had heard as well as create their own ideas.

Additionally, several studies have explored specifically how students make claims and use supporting evidence in their writings and if whole-class discussion can assist students in developing those writing skills. In a two-year long intervention with sixth-grade students in a philosophy class, Kuhn, Hemberger, and Khait (2016) explored this connection and found that the amount of words students wrote did not change over time; however, the kind of arguments that they incorporated did advance in complexity. Rather than include many arguments to weaken-other claims, students incorporated support-other claims, which show a higher cognitive level of argumentation. Engaging in the dialogue with the opposing view helped inform the students' overall view of the topic, and this was evident in their improved argumentative writing. Studying evidence in scientific argumentation, Iordanou and Constantinou (2015) investigated the utility of argumentative dialogue in developing evidence-focused writing among 11th grade students in Cyprus. In this study, students engaged in dialogic argumentation via instant messaging software with the goal of persuading the opposing view that their own position was correct, and students later reflected on their own use of evidence throughout the discussion. Students who participated in the intervention exhibited statistically significant improvements in their overall use of evidence; whereas, the experimental group did not improve. Engaging in dialogue and defending positions using evidence helped students to develop a meta-level realization of the importance of using evidence in discourse, and practice of that skill transferred to various topics.

Connection to Teaching Standards

Incorporating VTS in the classroom provides a mode by which teachers can engage their students with the intention of developing students' language use as suggested by the American Council on the Teaching of Foreign Languages (ACTFL). *ACTFL's Standards for Learning Spanish* outline for teachers explains that teachers are to guide student development in the areas of communication, cultures, connections, comparisons, and communities (Anderson et al., 2015). Students are to be adequately prepared to conduct themselves in spontaneous language use, both orally and in written contexts, and VTS gives them practice in those areas. According to ACTFL, students are to learn to interrupt in conversations, express agreement and disagreement, and support their opinions while taking into account the perspective of others. Because students in this intervention discuss authentic artwork, they also have the opportunity to engage in discussion about target cultures and have a chance to compare said cultures with their own. All of the aforementioned skills pertain to ACTFL's outlines and will be further developed throughout this intervention (Anderson et al., 2015).

Similarly, the Common Core (2018) includes in its standards for English and Language Arts that students need to develop critical-thinking skills and the ability to interpret texts. While artwork is not a written text, students can still work on the ability to interpret a medium and think critically about what might be occurring in the portrayal. Students must then further use their critical-thinking skills to defend their opinion and to navigate a discussion with peers who may or may not agree with their interpretation.

In summary, incorporating VTS in the L2 classroom meets various standards according to ACTFL and the Common Core as it allows students to develop their critical-thinking and L2 skill sets. Furthermore, the conclusions drawn from various studies in both L2 and L1 classrooms show that learning, thinking, and processing do not stop at the end of whole-class discussions, but rather students continue to create with the language

when asked to produce their own output. These findings have led to the development of this present study.

The primary goal of this investigation was to determine the effectiveness of Visual Thinking Strategies on students L2 writing production as well participation in whole-class discussion. The following research questions were posed:

1) How does incorporating Visual Thinking Strategies affect students' L2 writing production?

2) How does incorporating Visual Thinking Strategies affect students' participation in whole-class discussion?

Methodology

Participants

This study included participants from two Spanish IV (intermediate level) classes in a rural, Midwest public high school in the United States. One class served as the control group and the other as the experimental group. All but two students were in their fourth year of studying Spanish. Participants were 17-18 years of age, and a majority of the participants were White, 66%, and the next largest racial group represented was Latino, 20%. Gender breakdown of the participants who agreed to participate was 23 females and 9 males. Based on the language background questionnaire, six students were eliminated from the results because they indicated they had grown up in Spanish-speaking households.

This school is located in a community of approximately 10,000 people, and according to the State's Department of Education (2018a), 683 students attend the high school, and approximately 14% of the district's population identifies as Hispanic. 80% of the population is White with the remaining 6% percentage identifying as either Native American, Black, Pacific Islander, or Multiracial. Approximately 32% of students in the district qualify for free or reduced lunch (2018b), and the school graduation rate is 96%

(2018c). The school has a three-teacher Spanish department and operates on an eight-period day with class periods lasting 45 minutes.

Study Design

This study operated under a mixed-method design including a number of data collection tools. Prior to participating in the first intervention, consent and assent were obtained, and students completed a language background questionnaire. The first day of the Visual Thinking Strategies intervention was at the beginning of the 2018 Fall semester, and this data served as pre-data. The intervention occurred once a week for a total of eight weeks, with the final data being collected toward the end of the semester, data which served as post-data. Upon completing the study, students completed a questionnaire regarding their experiences. Finally, throughout the entire process, the classroom teacher kept a field journal.

Instructional Materials

Throughout the intervention, artwork was the medium by which students engaged in whole-class discussions. To facilitate eight weeks of intervention, a total of eight pieces of artwork were utilized. Artwork created by Spanish and Latin American artists was selected as to engage students in authentic, cultural products. The artwork utilized is listed in order of use: *Barbacoa para Cumpleaños* (Lomas Garza, 1993), *Jogar Capoëra: Danse de la guerre* (Moritz Rugendas, 1835), *Niños comiendo uvas y melón* (Murillo, 1650-1655), *Talking Across the Border Wall* (Cartagena, 2016), *Figura en una finestra* (Dalí, 1925), *The Collapse of a Dream* (Castillo, 2013), *Preparing a Feast* (Gachet, n.d.), and *National Policeman Using Ice-cream Vendor as a Shield During Skirmish with Demonstrators, San Salvador* (Montes, 1979-1983).

Procedures

As previously mentioned, the first step of the study was the language background questionnaire based off of Montrul's (2012) questionnaire. This tool included fourteen

questions which sought to determine the frequency of specific language use from students. Questions referred to languages spoken by self, family, and friends as well as a self-evaluation of language abilities in each speaking, listening, reading, and writing.

During the intervention process, students were instructed to look silently at the artwork for one minute and think about what they saw as well as what was going on in the picture. After one minute had passed, a teacher-facilitated, whole-class discussion about each specific work continued for ten minutes. The instructor's role in this process was to facilitate the discussion by utilizing the following three questions: What is going on in this picture? What do you see that makes you say that? What more can we find? Throughout the process, the instructor pointed to things the students referenced to draw the class's attention, accurately rephrased comments, and linked comments from various students. The instructor's role was to serve as facilitator, not as an expert on the piece. The whole process was conducted in the target language. After the ten-minute discussions, students were given five minutes to write about their individual thoughts and opinions on a lined paper. The control group was not exposed to interventions two to seven, but did participate in the first and final pieces of art for comparative purposes. Additionally, in order to analyze participation in whole-class discussion, the teacher recorded classes using an iPad.

Following the eight weeks of intervention, participants in the experimental group completed a questionnaire regarding their experiences. This questionnaire contained 11 short-answer questions plus one question which elicited a self-ranking of language abilities. Participants in the control group completed a shorter version of that same questionnaire containing five short-answer questions, plus one question eliciting a self-ranking of language abilities.

Finally, the teacher also collected field notes while she facilitated the classroom discussions and observed the process as an integral member of the intervention while

reflecting after each class discussion and recording patterns in participation, notable growth and change, and student reactions.

Analysis

In order to analyze the whole-class discussions, the researcher transcribed the first and final whole-class discussions. From this information, data was collected regarding the number of student utterances, average length of student utterances, percentage of students who participated, and frequency of same student utterances. With this data, descriptive statistics helped determine growth of participation. Paired *t*-tests were also employed on those data points from the first discussion to the final discussion to see if any change was statistically significant.

In order to analyze student writing samples, the hand-written writings were typed so as to more efficiently run data analysis. Data measures were replicated from a study on writing conducted by Serrano (2011) in order to calculate six measures: two measures of fluency, a measure of syntactic competence, two measures of lexical competence, and a measure for accuracy. Before moving forward, an example differentiating between word token and word type is worthwhile. In the sentence, *La flor es una flor bonita*, there are six word tokens but only five word types.

The first measure of fluency was total word token count of the sample as represented by W*to*. The second measure of fluency, which Serrano mentioned has been thought to measure more of grammatical complexity, required a count of total number of sentences, as represented by S, and to determine this fluency measure W*to*/S was calculated. To determine syntactic competence, the total number of clauses, C, was divided by the total number of sentences, thus C/S. Serrano incorporated Guiraud's Index to determine lexical competence, but because the writing samples in the present study are small, the researcher chose to look at number of word types, W*ty*. The percent of unique words were also examined; words that appear only once in the

sample, U. Finally, to calculate accuracy, errors divided by sentences was calculated, or ERR/S. Mechanical errors (spelling, capitalization, and punctuation) were not counted.

In summary, the dependent variables were:

- Written fluency: W*to*, W*to*/S
- Written syntactic complexity: C/S
- Written lexical complexity: W*ty*, U
- Written accuracy: ERR/S

To determine statistical significance, paired and unpaired *t*-tests were calculated on all of the data. For analysis of qualitative data, information provided by students through their post-study questionnaires was analyzed. This established what students perceived as beneficial about writing and whole-class discussions. The researcher coded by positive, negative, and neutral responses as well as by theme. In addition, field notes were analyzed to look for common themes that surfaced and to note student growth and as well as student reactions to the intervention.

Results

The following section will present the results from the pre and post data as well as describe students' reactions to the incorporation of this strategy in the Spanish classroom.

Measures of Writing

The first research question sought to evaluate how participating in VTS affected students' L2 writing. Table 1 represents the descriptive statistics of each dependent variable measurement for both groups in this study. It is important to note that a higher score in these measures indicates more fluency with the exception of the ERR/S measure in which a higher score would indicate less fluency. Also important to note is that incomplete sentences at the end of writing were not included in W*to*/S

measurement, C/S, or the ERR/S measurement; however, they were included in the other measures.

Table 1. Descriptive Statistics of Written Measures

	Control Group (N = 11)		Experimental Group (N = 13)	
	First Write Mean (SD)	Final Write Mean (SD)	First Write Mean (SD)	Final Write Mean (SD)
Fluency (W*to*)	44.55 (13.80)	51.09 (13.19)	49.62 (13.21)	68.62 (15.60)
Fluency (W*to*/S)	6.58 (2.35)	6.20 (0.97)	6.95 (1.68)	8.82 (1.58)
Syntactic complexity (C/S)	1.20 (0.33)	1.08 (0.10)	1.18 (0.18)	1.47 (0.27)
Lexical complexity (W*ty*)	30.45 (6.30)	34.36 (7.00)	33.38 (8.45)	41.46 (7.80)
Lexical complexity (U)	71.36 (8.25)	69.00 (8.79)	68.00 (4.42)	61.69 (8.23)
Accuracy (ERR/S)	0.80 (0.77)	0.90 (0.39)	0.78 (0.56)	1.24 (0.53)

In the control group, increases in fluency are observed in just two of the six measures: the measure of word tokens and the measure of lexical complexity regarding word types. However, in the experimental group, there were increases in every area except the measure of unique words and the measure of accuracy.

When completing analysis, an alpha level of .05 was used for all statistical tests. A paired *t*-test of the experimental group's first write to their final write demonstrate the following measures as having *extremely* statistically significant results: W*to*: $t(12) = 7.11$, $p = <.001$; C/S: $t(12) = 4.41$, $p = <.001$; W*ty*: $t(12) = 4.91$, $= <.001$. The following writing measures showed to be *very* statistically significant: W*to*/S: $t(12) = 4.01$, $p = 0.0017$; U: $t(12) = 1.87$, $p = 0.0041$; whereas ERR/S showed not quite statistical significance: $t(12) = 1.87$, $p = 0.0846$.

Unpaired *t*-tests using the scores of each group's final write were also computed. There was an *extremely* significant difference in scores for W*to*/S: t(22) = 4.77, p = <0.001; and C/S: t(22) = 4.44, p = <0.001. There was a *very* significant difference in scores for W*to*: t(22) = 2.93, p = 0.0076, and a significant difference in scores for W*ty*: t(22) = 2.32, p = 0.0296; and U: t(22) = 2.10, p = 0.0473. However, there were not statistical differences in ERR/S: t(22) = 1.70, p = 0.1029.

The effect sizes of each writing measure were calculated. The effect sizes for W*to*/S (d = 1.56) and C/S (d = 1.91) were found to exceed Cohen's convention for a very large effect (d = 1.30). The effect sizes for W*to* (d = 1.21), W*ty* (d = 1.00), and U (d = 0.85) were found to exceed Cohen's (1988) convention for a large effect size (d = 0.80). Finally, the effect size for ERR/S (d = 0.73) was found to have a medium effect size.

Measures of Speaking

The second research question sought to determine how participating in VTS affected students' participation. In order to answer this question, four data points were considered, and they are as follows: total words as a class, number of student utterances, words per utterance, and complexity, once again as measured by C/S. As seen below in Graph 1, the experimental group produced a greater number of words in their final intervention than the control group. The experimental group increased their spoken language production by 114%; whereas, the control group increased by 2.29%.
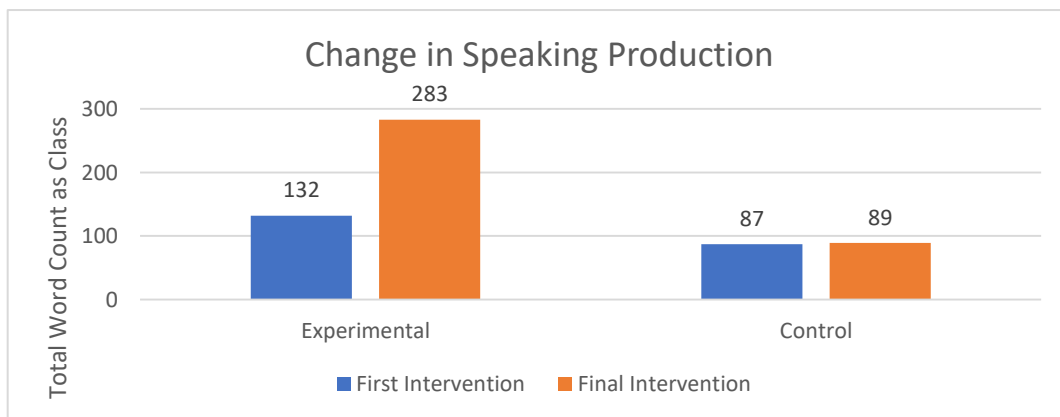

Figure 1. Change in Speaking Production.

Below, Table 2 represents the change in the other three measures of speaking production that occurred from the first intervention of VTS to the final intervention.

Table 2. Descriptive Statistics of Speaking Measures

	Control Group (N = 11)		Experimental Group (N = 13)	
	First Intervention Mean (SD)	Final Intervention Mean (SD)	First Intervention Mean (SD)	Final Intervention Mean (SD)
Student Utterances	2.45 (2.20)	2.18 (1.66)	3.38 (2.21)	3.30 (3.72)
Words per Utterance	2.61 (1.78)	3.90 (1.72)	2.46 (1.11)	5.22 (3.84)
Syntactic complexity (C/S)	0.48 (0.43)	0.99 (0.38)	0.41 (0.27)	0.77 (0.70)

A paired *t*-test of the experimental group's first intervention to the final intervention exhibit only one measure as having statistically significant results: words per utterance: $t(12) = 2.6629$, $p = 0.0207$. The other two measures were not statistically significant, and their results are as follows: student utterances: $t(12) = 0.0889$, $p = 0.9307$; and C/S: $t(12) = 2.1011$, $p = 0.0574$.

Unpaired *t*-tests using the scores of each group's final intervention were also computed. However, none of the measures showed to be statistically significant: student utterances: $t(12) = 0.9245$, $p = 0.2653$; words per utterance: $t(22) = 1.0516$, $p = 0.3044$; and C/S: $t(22) = 0.9432$, $p = 0.3558$. Although they did not show to be statistically significant, a few notable data points are of interest. In the category of average words per utterance, the control group did increase by 49%; however, the experimental group increased by 112%. In the category of C/S, the control group increased by 106%, whereas, the experimental group increased by 87%.

Student Reactions

After completing the eight-week intervention period, students responded to a questionnaire regarding their reactions to their participation in VTS. Without prompting, 8/14 students said they used class discussion to determine what to write. Additional students may also have used the discussion as inspiration, but they did not mention it in their responses. When asked how their writing changed over the intervention period, 7/14 mentioned they became more detailed and creative. An additional 5/14 also mentioned they became more focused on the message and meaning of creating a story rather than just listing simple observations. When asked to write about benefits and drawbacks to the strategy, 14/14 students mentioned benefits, and only 2/14 students included a drawback. What they mentioned as drawbacks were personal preferences of not enjoying the activity, not about the language acquisition process.

When asked if their writing had improved as a result of participating in VTS, 10/14 said yes. When asked how they decided whether or not to contribute to the whole class discussion, themed analysis of the responses showed that 8/14 decided based on their *confidence* in their ability to communicate in the target language (could be +/-), 4/14 decided to contribute based on their belief that their thoughts were creative or not, and 2/14 mentioned that they only shared when called upon. When asked if speaking helped improve their writing, 7/14 said yes, 6/14 said no, and 1/14 did not know.

In a multiple-choice option, 7/14 students conveyed that participating in whole-class discussion was most beneficial; 6/14 students said that using writing and participating in whole-class discussion together was most beneficial, and 1/14 said that writing was most beneficial. Selecting the discussion-alone option, students defended their opinion with responses of learning most from listening to others; speaking as valuable because it is more authentic; the idea-formulation happened at this part of the intervention; and in their writing they incorporated ideas from the discussion. Those who chose using the

two modes of output together as most beneficial defended their selection by saying that the discussion helped prepare them to write, helped them develop BOTH skills, and that it was easier to write once they had already spoken their ideas out loud.

Teacher Observations

Throughout the intervention process, the teacher kept a field journal of observations and reactions. Overall themes show that each week the whole-class discussions greatly progressed. Initial growth in the beginning weeks related to quantity and quality. For example, observations recorded a great change between week one and week two of the intervention. Noting that "statements were longer," "more than just statements of observation," and "almost all [students] wrote the <u>whole</u> time."

Throughout this eight-week intervention process, students began to bring their own emotions and experiences into the discussion as they attempted to understand the artwork. In addition, students were not merely producing more language, they were also thinking more deeply and learning to defend their opinions in the target language. Furthermore, they transitioned from merely observing facts, to using their own emotion and experience, and finally to looking outside of themselves to explore ideas of different cultures and perspectives. In addition, students took into consideration the various ways their peers interpreted the same piece of artwork.

Lastly, it is important to note several comments written in the field journal as the control group completed their second intervention at the time of the experimental group's eighth intervention. The teacher wrote, "[This] felt like going back in time to the first few in the experimental group. [Students made] short observations. [They were] not as imaginative or intrigued with all the possibilities. I had to probe more and ask follow-up questions WHEREAS in the experimental group I didn't rely on it [asking follow-up questions], but I think they'd get the hang of it quickly if we did it more."

Overall, when comparing their ease of Spanish conversation and writing, themes in the field journal note tangible changes present between the two groups.

Discussion

Overview

The purpose of this study was to investigate the impact that engaging in VTS would have on students' written L2 production as well as their participation in whole-class discussion. In order to determine the strategy's impact, study participants were divided into two groups: an experimental group which received eight weeks of the intervention and a control group which engaged in the intervention only twice, once for pre-data and once for post-data. Results were collected quantitatively based on students' written production and spoken production. Qualitative results came from both student questionnaires and a teacher field journal.

Summary of Findings: Measures of Writing

In order to answer the first research question, "How does incorporating Visual Thinking Strategies affect students' L2 writing production?" six writing measures were collected and analyzed, and they are as follows:

- Written fluency: word token (Wto), word token per sentence (Wto/S)
- Written syntactic complexity: total clauses divided by total sentences (C/S)
- Written lexical complexity: word types (Wty), percent unique words (U)
- Written accuracy: total errors divided by total sentences (ERR/S)

Quantitative data collected regarding the written measures of language show that the experimental group had positive growth in four of the six measures: in written fluency, word tokens and word tokens per sentence; in syntactic complexity clauses divided by sentences; in lexical complexity, word types. Furthermore, these measures were statistically significant, indicating that engaging in VTS did in fact have a positive impact on participants' growth in their L2 writing skills. *Extremely* significant were

word token, complexity, and word type, telling that VTS seems to have the most impact on helping L2 learners write a greater quantity of words, create more complex sentences as they explain their opinions and reactions to artwork, and incorporate a greater variety of types of words within that writing.   Also, *very* statistically significant was word tokens per sentence. Part of this statistically significant growth could be due to hearing the ideas and vocabulary of their peers throughout the whole-class discussion, and part of this could be due to continued critical-thinking practice through the course of the intervention.

The control group exhibited growth in just two of the six measures: in fluency, word tokens; and in lexical complexity, word types. In both measures where the two groups showed gains, the experimental group showed larger gains than the control group. These results demonstrate that skills in the L2 grew throughout the school year in both groups, but that more growth occurred in the experimental group as a result of participating in VTS. Affirming that data were the unpaired *t*-tests calculated between each group's final write which resulted in *extremely* significant differences in word tokens per sentences and complexity, *very* significant differences in word tokens, and significant differences in word types and unique words.   Therefore, the utility of incorporating VTS in the L2 classroom is defendable when observing the statistically significant growth in the results.

While there was improvement in most categories, growth was not present in either the experimental or the control group in the following two areas: lexical complexity (U) and accuracy (ERR/S).   There was likely not an increase in percentage of unique words because participants were writing more words after eight weeks, and when writing a greater quantity, it is natural to repeat words that pertain to the topic at hand, especially if students were creating a story and referring to ideas more than once.   Serrano (2011) agreed with this conclusion that L2 learner's accuracy decreases when complexity increases. Similarly, in the measure of ERR/S, with increased quantity of writing comes

more potential for error. Both quantitative data and qualitative data from the field journal evidence that students were taking more risks with their language as they progressed through the intervention process, and with more risk comes more potential for error. Furthermore, their post-intervention questionnaire responses showed that they were more focused on creating stories and ideas than listing simple observations, and when pushing one's language production to more advanced expression, more errors are likely to occur; therefore, it is not necessarily negative that this measure did not improve and could in fact indicate a different kind of improvement in language use.

Other studies noted similar improvements to the present study regarding student improvement. VanDerHeide's (2018) study conducted in the L1 observed that as students engaged in whole-class, teacher-facilitated discussions, they began to write with more commentary, nuance, and fluidity over time, showing high value of classroom talk as it corresponds to writing. In Kuhn, Hemberger, and Khait's study (2016) conducted in the L1, the amount of words students wrote did not change over time; however, the kind of arguments that they incorporated did advance in complexity. However, the present study saw growth in both amount of words produced and complexity. This study was conducted in the L2, and so perhaps with more contact time with the L2 and opportunity for production and practice, there was more room for growth than in the L1.

Also valuable is a comparison between the present study and studies conducted in the L2. Studies completed by incorporating whole-class discussion and writing together showed that students increased in quantity and quality of L2 production as a result of said discussion (Baralt, Pennestri, & Selvandin, 2011; Hosseinpour & Koosha, 2016). The present study likewise showed growth as a result of engaging in VTS, engaging in both speaking and writing forms of output together. Regarding accuracy, Dykstra-Pruim (2003) found that students performed with higher accuracy on the written task, but they attempted more complex structures in the oral task. While the present found that

students did increase in both syntactic and lexical complexity of their writing, it did not find that students performed with higher accuracy. However, the present study does corroborate the results of a study completed by Granfeldt (2007) which found that students committed more lexical and grammatical errors in their written production. Overall, Serrano (2011) mentioned that a variety of studies show that L2 learner accuracy decreases when their complexity increases, but other studies lead researchers to argue that complexity and accuracy do not need to be in competition. The present study adds information to our understanding, but there is still much to be discovered about the way fluency, complexity, and accuracy interact as learners progress through their language acquisition, and furthermore, these could interact differently based on the mode in which students engage.

Summary of Findings: Measures of Speaking

In order to answer the second research question, "How does incorporating Visual Thinking Strategies affect students' participation in whole-class discussion?" four data points were considered: total words as a class, number of student utterances, words per utterance, and complexity, once again as measured by total clauses divided by total sentences (C/S). When interpreting changes in speaking measures within the experimental group, there was statistical significance found in only one speaking measure, words per utterance, but I think that data point is telling. The control group did increase by 49%; however, the experimental group increased by a massive 112%. This shows that students engaging in the intervention were consistently producing more language than the control group. They were able to think and speak spontaneously and increase their L2 production. In addition, looking at the sheer amount of language production overall from the classes shows fantastic growth in the experimental group, increasing by 114%, while the control group basically maintained the same amount of speaking production, increasing by a mere 2.29%.

Overall, sufficient quantitative data that was statistically significant suggest that pairing whole-class discussion with writing through VTS guided students to increased gains in their L2 abilities. Hubert (2013) found that students tended to be more proficient in writing than in speaking and opined that writing could be utilized to guide students to higher speaking proficiency; growth shown in this study supports his hypothesis. Engaging in the two forms of output guided students to advance more in their language development and production.

Discussion of Qualitative Findings

Not only did quantitative data show that engaging in VTS caused students to grow, but qualitative data also showed positive effects on student achievement. Comments from students show that they saw growth in their language abilities and also in their understanding of perspectives of other viewpoints and cultures. One participant reflected, "[VTS] helps to see the different culture in the Hispanic world. And has helped me talk and write better with description and more complicated sentences." Similarly, another student commented, "Writing about art made me think more creatively. It made me look at different points of view." Another student valued the intervention because "It allows us to share thoughts or interpret our ideas to each other."

These comments contribute to the evidence that students were developing skills as outlined by ACTFL regarding communication, cultures, connections, comparisons, and communities (Anderson et al., 2015) as well as skills of critical thinking and interpretation of a text as outlined in the Common Core (2018).

When asked if speaking improved their writing 7/14 thought yes, and 6/14 thought no. However, in this experimental group there were many introverts who wrote confidence-related statements regarding their own creativity and L2 ability, and their reactions exhibited their feelings about their lack of growth. However, regardless of

their mixed emotions, the empirical data show that they did in fact grow throughout the process more than their counterparts who did not participate in the intervention.

Regarding listening during the whole-class discussion and its impact on their writing growth, 13/14 affirmed that it helped, and 1/14 claimed it did not. A common theme in responses was that listening to their peers helped them learn not only new words but also to be exposed to new ideas and perspectives that they would not have been exposed to on their own. The field journal also noted that, "I am noticing that I am surprised at how many of them can learn quickly a new vocabulary word when we are using it in context so they can attach meaning to it." This data point, however, seems to show a disconnect in their minds. Their responses to speaking show that some do not want to speak because they think they lack original ideas and/or confidence in their language ability; however, they see the value of listening to others' ideas and perspectives, yet they do not seem to transfer the value of their own speaking and verbal thought-sharing as being able to contribute to the learning experience of the group as a whole.

All in all, qualitative results from the questionnaires provide insight that students reflected and realized that as a whole, engaging in both whole-class discussion and writing through VTS had a positive impact on their language development. One participant commented, "Porque [because] when you say it out loud it is much easier to write in words afterwards and helps me for the writing portion." Another student realized and shared that "If I didn't see something, others did. Vice versa, I'm sure. It helps me that I could ask for what a word was in Spanish." Finally, a participant reflected, "Doing both things helps with listening, speaking, and writing." Similarly to these students commenting on the effectiveness of pairing these two forms of output together, van Drie and van de Ven (2017) also observed that students were reproducing ideas from whole-class discussions in their writings, and longitudinally students began

to transform ideas they had heard and also create their own ideas. Their study and the present study seem to corroborate one another on the value of such interventions.

In corroboration with student reactions regarding participation in VTS, the teacher field journal noted tangible growth and positive change in the experimental group. Themes showed that in the beginning students advanced from simple observations of facts to explanations of what they observed. From explanations they advanced to viewing the artwork through an emotional and personal lens, and from there, they advanced to considering perspectives of their peers and the perspectives of members of the cultures represented in various artwork. As observed in the field journal by the teacher, "students were expressing the idea that people within the photo might have different thoughts and opinions from one another, showing awareness of varying perspectives throughout the world." Throughout this intervention students had ample opportunity for output, and each time they spoke, they were able to express an idea and find success in their communication. With that success came a confidence and a willingness to speak again and to express more the next time. Even those who chose not to speak as frequently benefitted because they were being exposed to constant input and a variety of ideas and vocabulary. Because the control group did not have these opportunities each week, their speaking skills did not develop to be as advanced and complex, nor did they have the opportunity to advance their critical thinking skills or to seek to understand and account for other perspectives.

In addition, the field journal indicated that student writing reflected their growth observable during the whole-class discussions. Students were incorporating adjectives into longer, descriptive sentences rather than simple sentences with one fact each. For example, rather than writing something like "The dog is sad." They would write, "There is a sad dog underneath the tree because it's a hot day." In the following entry I compared their first write to their sixth write, "Their defense of their thoughts and their analysis is much deeper than just observational [as it was] before."

All in all, both the quantitative and qualitative findings from this study indicate that engaging in VTS had positive effects in developing students' L2 abilities. Furthermore, students were helping one another when a vocabulary word was missing from their memory, causing a deeper spirit of teamwork as they engaged in exploration of each image. Because students were focused on meaning and conveying their thoughts, they were motivated to express correctly and creatively while also defending their opinions, creating an amazingly effective experience for L2 acquisition and growth.

Conclusions

In summary, results of this study indicate that by way of engaging in Visual Thinking Strategies students were showing significant gains in various writing skills as well as quantity of speaking production. Student reflections and field journal comments demonstrated that students were also developing their critical thinking skills as they explored a variety of artwork and learned to view cultural perspectives with an open mind, as well as to listen to opinions of their peers with acceptance.

As a conclusion from her study results, Dykstra-Prium (2003) suggests that students should practice orally first because they will likely attempt more language and more complex language orally than they would in writing; and this study affirms that notion and suggests that VTS is a worthwhile strategy to incorporate in the L2 classroom as students build proficiency. Incorporating VTS in the L2 classroom met various standards according to ACTFL as well as the Common Core allowing students to further develop their critical-thinking and L2 skill sets. Furthermore, the conclusions drawn from both the present study and various studies in both L2 and L1 classrooms show that learning, thinking, and processing do not stop at the end of whole-class discussions, but rather continue as students create with the language when asked to produce their own output. This all indicates that VTS is a worthwhile strategy to incorporate into the L2 classroom as way to facilitate student growth.

Limitations and Recommendations

One of the limitations of this study was the small population size. Because of this small population, data might not have been conclusive enough to show a whole picture. Along those lines, the two groups were somewhat different in as much that there were six heritage or native speakers in the control group and none in the experimental group. It is possible that the participants in the control group did not have as many opportunities to produce language in their two interventions as their counterparts in the experimental group.

Another limitation could be the artwork itself and the extraneous variable it could have played throughout. On a few occasions in the surveys, students commented that their participation in the whole-class discussion was influenced based on if the artwork elicited ideas in their minds. While it is not possible to capture every student's attention with every piece of artwork, it is possible to vary the selection enough that over time every student is engaged by at least several pieces. As a result, it is important to allow students to engage in this process over an extended time span so as to increase the percentage of engagement.

Regarding recommendations for further study, researchers should attempt to determine if there is a correlation present between students' individual speaking frequency and the growth of their writing. It would be valuable to determine if students who volunteer more in the whole-class discussion experience larger gains.

As for future instruction, the data suggest that VTS is a worthwhile strategy to incorporate in the foreign language classroom. Benefits were shown for developing language use as well as benefits of critical thinking and understanding perspectives of other individuals. After completing this intervention process, the classroom teacher continued using VTS in both the experimental and control groups and continued to

observe gains in language use, confidence, and creativity and encourages other teachers to do the same.

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