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Exploring Digital Literacy Practices via L2 Social Reading

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This exploratory study analyzes the digital literacy practices that resulted from learner-learner interactions within a virtual environment when collaboratively reading eighteen Spanish poems via a digital annotation tool over a four-week period in a college-level Hispanic literature course. Using an ecological theoretical perspective and centering on the affordance construct (van Lier, 2004), we investigate how linguistic characteristics of the poems affect the nature of learners' annotations and also analyze how learners' written comments/annotations change over time when engaging in L2 social reading. Findings suggest that when the lexical diversity of the poems increased, the number of literary affordances that emerged in learners' annotations decreased. Statistical analyses also revealed that the total number of errors and the lexical diversity of learners' written annotations did not change when looking at the class as a whole. However, change in writing was noted at the individual learner level. We conclude with a number of pedagogical suggestions regarding the incorporation of digital social reading in L2 environments and offer future avenues for research in this nascent area.

INTRODUCTION

The widely cited Modern Language Association (MLA) Report (Pratt et al., 2007) addressed a number of issues related to the ways foreign language (FL) departments in the United States (US) educate undergraduate students. The report suggested that FL majors, by the time they finish their degrees, should have acquired translingual and transcultural competence; the latter being defined as the “ability to comprehend and analyze the cultural narratives that appear in every kind of expressive form—from essays, fiction, poetry, drama, journalism, humor, advertising, political rhetoric, and legal documents to performance, visual forms, and music” (p. 4). In essence, the report has served to move some educators and language program directors in the US to begin re-envisioning the ways in which language and content (i.e., literature, culture, history) might be jointly taught from the beginning and throughout the entire course sequence in any given FL program (for more on these kinds of programmatic/curricular efforts, see Allen & Paesani, 2010; Byrnes, Crane, Maxim, & Sprang, 2006; Maxim, 2014).

To meet some of the challenges set forth in the MLA report, many educators have looked to a multiliteracies framework (Cope & Kalantzis, 2009; Kern, 2000, 2003; New London

Group, 1996) to develop a pedagogy of multiliteracies (e.g., Allen & Paesani, 2010; Michelson & Dupuy, 2014; Paesani, 2016), which can be defined as a “socially responsive pedagogy that helps us understand how to connect a sociocultural perspective of learning to classroom teaching” (Hall, 2001, p. 51). A multiliteracies perspective views reading and writing as “socially embedded communicative acts that bring together the linguistic, cognitive, and sociocultural dimensions of literacy, dynamically interacting together as meaning is created from and through digitally mediated texts” (Paesani, Allen, & Dupuy, 2016, p. 248). This perspective is particularly fruitful when investigating language learning in digital environments. Our study is, in part, informed by a multiliteracies approach in that a digital social reading environment requires learners to simultaneously use and further develop a variety of semiotic resources when interacting with each other via an L2 literary text. As such, the incorporation of social reading to analyze L2 literary texts might serve as one way for learners to achieve transcultural competence.

With a growing interest in multiliteracies perspectives on second language (L2) learning and teaching, coupled with the omnipresence of technological tools in the academic and social lives of many undergraduate students in the US, traditional notions of literacy are being re-conceptualized and are changing the ways in which texts are produced, accessed, and interpreted. As a result, a current focus of research in the computer-assisted language learning (CALL) field investigates various aspects related to students’ developing L2 digital literacies (Chun, Kern, & Smith, 2016; Hafner, Chik, & Jones, 2015; Kern, 2015; Thoms, Sung, & Poole, 2017; among others). While no single definition of digital literacies exists in the CALL literature (Meyers, Erickson, & Small, 2013), some (e.g., Lankshear & Knobel, 2008) consider digital literacies as “a shorthand for the myriad social practices and conceptions of engaging in meaning making mediated by texts that are produced, received, distributed, exchanged, etc., via digital codification” (p. 5). This current study therefore contributes to CALL literature on L2 social reading and, more generally, to the evolving understanding of what digital literacy entails.

Our exploratory study investigates the affordances (van Lier, 2000) of L2 social reading via the use of a digital annotation tool (DAT). A DAT allows learners to annotate digitized texts and make comments that others can collectively read in a virtual space. Although some preliminary work has been carried out to highlight possible ways in which DATs can be used in L2 learning contexts (e.g., Blyth, 2014), there is a dearth of empirically based research that investigates how and why affordances emerge in the interactions among learners when participating in L2 digital social reading. Furthermore, few studies have analyzed the nature of learners’ written annotations when carrying out L2 digital social reading via DATs.

It is important to note that this current study is part of a larger project (Thoms & Poole, 2017) that takes an ecological theoretical perspective (van Lier, 2004) to analyzing learner-learner and learner-text interactions within a virtual environment when collaboratively reading eighteen Spanish poems over a four-week period in a college-level Hispanic literature course. The primary goal of the larger study is to identify and illustrate the kinds of affordances that emerge from learners’ virtual interactions with each other while reading and annotating the poems via a DAT. While the analyses in this article continue to center on the theoretical construct of affordance, we also investigate how text-based variables, such as the linguistic features of digitized texts, affect the kinds of affordances/annotations that emerge when learners participate in digital social reading outside of the physical L2 classroom via a DAT. This study also looks at the nature of learners’ digital writing practices in relation to the linguistic, literary, and social affordances when interacting in an L2 social reading

environment. In essence, we analyze the digital literacy practices of learners when interacting with each other in an L2 online social reading environment. We begin our review of the research literature by highlighting studies that investigate digital social reading.

RELEVANT LITERATURE

DAT Research in L2 Contexts

Research on DATs has thus far primarily been carried out in first language (L1) contexts (e.g., Gao, 2013; Kiili, Laurinen, Marttunen, & Leu, 2012; Lu & Deng, 2013; Mendenhall & Johnson, 2010; Yang, Yu, & Sun, 2013; Zarzour & Sellami, 2017), where learners read literary texts written in their L1 and provide annotated comments on them using their L1. In L2 contexts, initial studies have mostly investigated the impact of DATs on English as a Foreign Language (EFL) students, specifically targeting student perceptions (Lo, Yeh, & Sung, 2013; Nor, Azman, & Hamat, 2013), the impact of DATs on reading comprehension scores (Chang & Hsu, 2011; Yeh, Hung, & Chiang, 2017; Yu, 2014), and/or how different uses of DATs by students impact reading skills and approaches (Chen, Wang, Chen, & Wu, 2016; Tseng, Yeh, & Yang, 2015; Yeh, Hung, & Chiang, 2017; Yu, 2014).

To date, only three studies have been published that investigate the use of DATs in L2 classroom contexts other than EFL learning environments. Blyth (2014) describes case studies of participants using a DAT called eComma, including experimentation with digital social reading in two undergraduate French courses. In a first-semester French language course, students used eComma to read and annotate prose poems written in French by a Haitian refugee living in Canada. Students used their L1 (English) when annotating/commenting on the French poems. The instructor reported evidence of students using interpretive strategies, such as collectively evaluating the meaning of French vocabulary. In addition, she observed that students reflected on cultural differences (i.e., those described in the readings vs. students' own cultural backgrounds), references to textual features (e.g., comments related to stanzas), and evidence of students co-constructing meaning (e.g., Jeong, 2003; Mercer, Littleton, & Wegerif, 2004; Swain, 2000).

In the second case study highlighted in Blyth (2014), students in a fourth semester, college-level French language course read a French surrealist poem and were asked to collectively annotate the poem in either their L1 or L2. The instructor highlighted how she used the various features in eComma to read through students' annotations to help her better prepare for in-class discussions about the poem. The instructor noted that many students' annotated comments included visual images from surrealist paintings which, in turn, complimented their understanding and interpretations of the French surrealist poem that was being analyzed.

The case studies in Blyth (2014) represent early attempts to experiment with DATs in an FL setting to demonstrate the learning and teaching benefits of social reading. Building on this work, Thoms, Sung, and Poole (2017) investigated the linguistic and pedagogical benefits and challenges of using eComma in a second-semester, undergraduate Chinese language course. Over the course of a two-week period, students read and commented on two short stories in eComma that were written in Chinese characters. The study illustrated how learners used eComma to co-construct meaning and scaffold their learning while reading two Chinese literary texts. The most common use of the eComma tool involved learners querying fellow learners about the meaning of vocabulary/Chinese characters.

Identifying linguistic and/or literary evidence in texts by students is often described as close reading of L2 literature (Grabe & Stoller, 2011), a reading skill regularly encouraged by L2 language and literature instructors alike. Similarly, Brandl (2008) states that the “integration of any kind of text in the L2 classroom has multiple purposes...function[ing] as a springboard for integrating other skills” (p. 346). In the case of L2 social reading via DATs, learners are afforded the ability to not only reflect on linguistic aspects of the L2, but are able to do so by referencing the digitized text through the use of a variety of annotation features. In other words, both linguistic and literary comments made via DATs are realized *in situ* or within the digitized text itself.

The present study follows from a pilot study (Thoms & Poole, 2017) in which we used a DAT called Hylighter in an advanced, college-level Spanish poetry class to explore its benefits and challenges from instructor and student perspectives, as well as to provide empirical evidence for the affordance construct (van Lier, 2004). Similar to Blyth (2014), we found that the instructor gained valuable insights regarding their students’ understanding of the various Hispanic poems read and annotated via Hylighter. In contrast to previous work on the use of DATs in an L2 classroom context (e.g., Chen et al., 2016; Thoms, Sung, & Poole, 2017; Yu, 2014), this study noted that a majority of students’ annotated comments were either literary or social in nature, with few focusing on linguistic issues (i.e., lexical or grammatical queries to fellow students).

One of this pilot study’s limitations was the fact that text difficulty level was not taken into consideration when evaluating how the literary, social, and linguistic affordances defined in the study emerged via learners’ written annotations. Given that text difficulty is an important factor to consider when investigating L2 reading issues (Bernhardt, 2011; Brantmeier, 2013), one of the goals of this current study was to understand how the difficulty level of the 18 Hispanic poems affected literary, social, and linguistic affordances that emerged in learners’ annotations (see Methodology section below for more on how we define text difficulty). To better understand the dynamic nature of L2 social reading, we make use of an ecological theoretical perspective on L2 learning.

Ecological Theoretical Views on L2 Learning

As in the pilot study (Thoms & Poole, 2017), the theoretical framework of this current study relies on ecological views and constructs originally used in psychology (e.g., Bronfenbrenner, 1979), specifically, the affordance construct. Van Lier (2000) first borrowed the term affordance from the ecological psychologist James Gibson (1979), according to whom affordances are embedded within an environment/ecosystem, and are “what [the environment] *offers* the animal, what it *provides* or *furnishes*, either for good or ill” (1979, p. 127, italics in original). He goes on to say that an animal’s awareness and perception of the affordances in the environment play a vital role when determining whether an affordance is helpful or not to the animal or if the animal makes use of it at all. As such, Gibson’s (1979) definition views affordances as characteristics that are part of the environment and are something that are picked up and used by an animal based on its perception of their usefulness to the animal at a particular moment.

Van Lier (2004) further clarifies Gibson’s (1979) definition, explaining that affordances are not solely features found in an environment. Rather, affordances are born out of the *interactions between* an organism and its environment. Van Lier (2004) and others (e.g., Auyang, 2000) have articulated how the aforementioned view of affordance can be applied to a

language learning context. In a language learning environment/ecology (e.g., an L2 classroom), a number of organisms (e.g., learners) interact with each other. When learners are actively engaged with each other, with their instructor, and/or with other features in the environment (e.g., literary texts), affordances (e.g., learning opportunities) emerge. From an ecological perspective then, a successful language learner wields a certain amount of agency over his or her environment, as it is his or her social activity and awareness through which affordances emerge in language learning contexts. Put another way, a number of learner- and context-based factors work together to give rise to affordances in physical or virtual L2 learning environments.

Much SLA research to date (e.g., Darhower, 2008; Hoven & Palalas, 2015; Lafford, 2009; Miller, 2005; Thoms, 2014) has made use of ecological theoretical views of language learning to understand the social and contextual factors inherent in learning environments that affect how learners interact with each other and their specific learning context(s). Similarly, Chun (2016) characterizes the present stage of CALL research (i.e., the 2010s) as one that represents an “ecological CALL” (p. 106) and argues that “this more encompassing view of language acquisition goes beyond classroom walls, as do technologies that can be accessed anytime and anywhere” (p. 106).

However, few studies making use of an ecological theoretical perspective have operationalized the affordance construct. As previously stated, one of the primary aims of our project (Thoms & Poole, 2017) was to provide empirical evidence regarding what affordances might look like in the written discourse of learners when annotating L2 literary texts via a DAT. In Thoms and Poole (2017), we identified three types of affordances in learners’ online written annotations and termed them literary, social, and linguistic affordances (see Methodology section below for definitions of each affordance). This current paper builds on these findings in that we now investigate how features of literary texts (Spanish poems, in this case) affect the emergence of the three aforementioned affordances. Additionally, we explore the written discourse of these college-level learners in the context of collaborative, asynchronous reading and annotating activities via a DAT. Furthermore, this paper contributes to our understanding of how learners’ literacies are dynamic and ‘living’ in the sense that they are not passive consumers of texts, but are indeed constantly enacting a number of literacy practices (New London Group, 1996) in a digital social reading environment. Specifically, we investigate the following research questions:

- 1) What is the relationship between L2 text difficulty and the linguistic, literary, and social affordances/annotations that result when learners engage in social reading in a virtual environment?;
- 2) What is the nature of L2 learners’ digital writing practices and how do these relate to the linguistic, literary, and social affordances that emerge when interacting in a digital social reading environment?

METHODOLOGY

Research Site & Participants

The research site was an undergraduate Hispanic poetry course offered by a large university in the Western region of the United States. We chose a poetry course for the study given that poetry lends itself to more interpretations by learners when compared to other literary

genres; we hoped this would lead to more interactions among learners in the DAT. While the course covered a number of different poets, the majority of the poems read during the data collection phase of the project included work by Federico García Lorca, Pablo Neruda, Jorge Guillén, and Juan Antonio González Iglesias (see Appendix A for a complete list of the poems). The course met once each week for two hours and thirty minutes and was taught via a seminar approach, where the teacher and students primarily engaged in face-to-face, whole-class discussions to analyze and interpret the various poems assigned for each class. The course was taught almost exclusively in Spanish; most of the primary and secondary sources used were written in Spanish while only a few were bilingual texts.

Fifteen undergraduate students participated in the study; 11 males and 4 females, ranging in age from 21 to 28 years old. All of the students were Spanish majors and all but one indicated that their native language was English; one student indicated that English and Portuguese were her native languages. All of the students in the course were either in the last or penultimate semester of their undergraduate Spanish studies. As such, all of the students had already taken several required Spanish language, literature, and culture courses before enrolling in the Hispanic poetry class used in the study. Subsequently, most students were familiar with reading, comprehending, interpreting, and talking about Hispanic literature in Spanish. Finally, the instructor of the course (“John”) was an Assistant Professor who had near-native oral proficiency in Spanish and had been teaching in the Spanish section of the department for six years at the time of the study.

Digital Annotation Tool Used in Study

The DAT used in our study, Hylighter (Lebow, 2012), uses a private domain that requires users to first create an account and then upload and share a document to be annotated. Once the document is uploaded and shared, other users can read the digitized text, make comments, and tag different portions of the text. Whenever a learner highlights/annotates any part of the text, a threaded discussion is created where other learners can interact and comment on what has been annotated (see Figure 1).

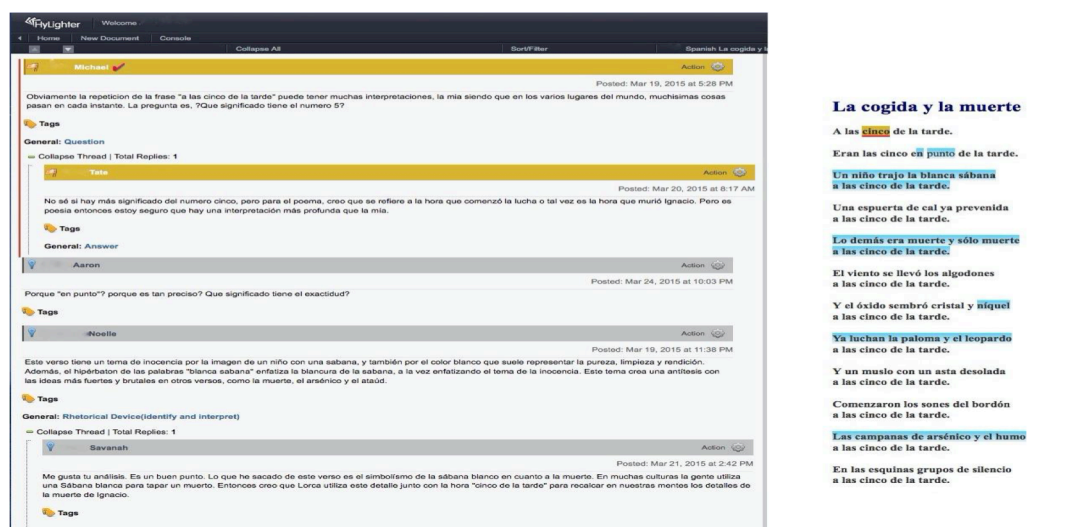


Figure 1. Hylighter interface

Digital annotation tools like Hylighter offer a number of features for readers to use when

engaging in pre-, while-, and post-reading activities. For example, the creation of word clouds based on the uploaded/digitized texts allows learners to infer meaning about a text solely based on the most commonly used vocabulary words in any given text. Many DATs also offer the ability to tag portions of the text, and thus lend themselves to instructional activities that invite students, for example, to identify specific lexical or grammatical content. In both the pilot project and this current study, students were instructed to only use Hylighter's basic annotation feature and the tagging function when making comments on the L2 Spanish texts. However, due to technical issues with the tagging feature reported by some students during the data collection phase, we only focus on students' use of Hylighter's annotation/comment function when they were reading and annotating the various poems. Finally, Hylighter was used in this study primarily due to some of its back-end features (e.g., ease of exporting students' annotations and tags) and the fact that the tool's creators allowed the researchers to use the tool for free since it had never before been employed in an L2 learning environment.

Data Collection Procedures

The study took place during the Spring 2015 semester. The researchers worked with John to determine that students would read three to five poems each week in Hylighter over the course of the four-week data collection period. In all, students read and annotated a total of 18 poems for this study during weeks 12–15 of the semester. The only selection criterion for the poems was that they were an appropriate length to ensure that roughly the same amount of text was assigned each of the four consecutive weeks; text difficulty was not considered during this initial phase. Before the data collection phase, students received information on how to use the various features in Hylighter and experimented with those features via two sample digital texts during a 50-minute training session held in a computer lab. The researchers demonstrated the various features and fielded students' questions in English to ensure that all students knew how to annotate and comment on the virtual texts via Hylighter.

Thirty percent of a student's grade in John's course consisted of the student carrying out 10 mini analyses of poems during 10 weeks of the 16-week semester. The 200-word mini analysis homework assignments required students to react to the various poems assigned each week via prompts provided by John. The mini-analysis homework assignments were done individually by students outside of class. However, for the poems read through Hylighter, John and the researchers decided that in lieu of having students carry out their regular mini analysis assignments, they would require that the mini analyses be done virtually via students' comments on the poems read in Hylighter. The virtual mini analysis assignments required each student to make at least one comment on each of the assigned poems read in Hylighter by midnight on Saturday of each week. As such, students had from Wednesday evening after class through Saturday midnight to read and make their initial annotated comments on each of the assigned poems. Beginning on Sunday and continuing through Tuesday evening, students were asked to respond to another student's initial comment on each of the poems. One of the researchers periodically sent students an email each week reminding them about the aforementioned commenting periods. This staggered approach to reading and annotating throughout the week allowed for more interaction among students and reduced the risk of having a majority of students read and annotate the

poems all at once and only shortly before the in-class meeting each week (Thoms, Sung, & Poole, 2017).

It is worth noting that the mini analysis document distributed to students during each of the four weeks of the data collection period served as a reading guide in that it contained possible questions and topics that students might consider when reading the poems (see Appendix B for a sample of one of the reading guides). Overall, students' contributions via Hylighter over the course of the four-week study represented the equivalent of four mini analyses. As a result, the Hylighter contributions represented 12% of each student's final grade.

Definitions of Affordances in Study

Given that one of the goals of the present study is to investigate the relationship between text difficulty and the emergence of literary, social, and linguistic affordances identified in Thoms & Poole (2017) (see Appendix C), we define these briefly here. A literary affordance is any discursive move that expresses insights related to textual analysis, such as a learner's interpretation of the meaning of a text, another learner's expansion of that interpretation, or comments related to rhetorical devices used by the poet. A social affordance is defined as any discursive move that provides encouragement, expresses one's opinion about another's comment (e.g., signaling agreement or disagreement), or provides a comment that is not directly related to the text under analysis. Finally, a linguistic affordance involves any discursive move that provides explicit linguistic information to the learner, such as information regarding grammatical structures or lexical meaning.

Statistical Analysis Instruments and Procedures

Text Difficulty Variables

To measure text difficulty, many past studies have used popular readability formulas, which often take into account several different measures of vocabulary and syntactic complexity (Huang, Chern, & Lin, 2009; Young & Bowers, 1995). However, it has long been argued that such measures of text difficulty in many readability formulas are not enough to accurately assess poetry (Davis, 1970; Klare & Buck, 1954). In this study, we use three measurements to determine text difficulty. First, we used the Spanish Vocabulary Online Profiler (SVOP) tool (Wals, Washburn, Glenn, & Graham, 2013) to determine the K1, or percentage of vocabulary words in the 1000 most frequent word families, for each poem. Poems with lower K1 levels should be more difficult as lower K1 levels would mean that there are more words outside of the most frequent 1000 word families. Next, we used the Simple Natural Language Processing tool (Crossley, Allen, Kyle, & McNamara, 2014) to determine the type-token ratio (TTR) of each poem. The TTR is calculated by dividing the total number of unique words in a text by all of the words in a text. The TTR is used as a measure of lexical diversity. Higher levels of TTR should thus be associated with more difficult text as there is less repetition of words. Finally, to take into account difficulties specific to poetry, we asked John and two other Spanish literature professors (one native and the other a non-native Spanish speaker) working at the institution where data collection took place to read the poems and identify both the rhetorical devices and any cultural or historical instances of the poem that would be difficult for the students to understand. The instances

identified by each professor were added and then divided by three to create an average professor difficulty rating (Prof_Diff).

Outcome Variables

The three measures of text difficulty (K1, TTR, and Prof_Diff) were used in three different models to predict three different outcome variables. The outcome variables used were the affordances defined in the previous section: linguistic, literary, and social. In Thoms and Poole (2017), each annotated comment made in Hylighter was recorded as an observation and then was coded as either linguistic, literary, and/or social in nature. Since each annotated comment could potentially contain more than one affordance, or multiple instances of the same affordance, some observations were assigned multiple codes. Table 1 below provides an overview of (a) the average amount of comments containing literary (Lit), linguistic (Ling), and/or social (Soc) references, and (b) the K1, TTR, and Professor Difficulty rankings for each poem.

Table 1. Descriptive statistics for average literary (Lit), linguistic (Ling), and social (Soc) affordances made by students (N) per poem.

Poem	N	Lit (M)	Ling (M)	Soc (M)	K1	Prof_Diff	TTR
La Sangre	15	3.33	0.00	2.60	0.74	11.67	0.53
La Cogida	15	2.80	0.27	1.53	0.86	5.67	0.34
Llagas	15	2.60	0.00	1.73	0.72	2.67	0.73
Cuerpo Presente	15	2.47	0.07	1.87	0.77	9.33	0.56
Soneto	15	2.47	0.00	1.67	0.76	2.67	0.68
Oda Alcachofa	15	2.40	0.13	2.60	0.71	2.00	0.66
Ay Voz	14	2.29	0.14	1.50	0.70	5.67	0.76
Alguien	14	2.07	0.43	1.43	0.80	3.00	0.61
Naturaleza	15	2.07	0.27	1.47	0.72	2.00	0.78
Oda Castaña	14	2.00	0.14	1.43	0.67	3.33	0.69
Noche del Amor	14	1.79	0.29	2.00	0.76	4.67	0.74
Tiene	14	1.79	0.14	1.50	0.75	5.00	0.58
Oda Tomate	15	1.67	0.13	1.27	0.68	2.33	0.69
El Poeta Dice	14	1.57	0.21	1.21	0.83	2.33	0.61
Oda Calcetines	15	1.53	0.00	1.53	0.67	6.33	0.66
Oda Jardinera	15	2.60	0.47	1.20	0.77	5.33	0.68
Más Allá	14	2.47	0.36	3.14	0.78	4.00	0.69
Oda Bicicleta	14	2.47	0.43	2.43	0.74	3.33	0.74

RESULTS

The results of this study are answered based on the two research questions under investigation.

Research Question 1. What is the relationship between L2 text difficulty and the linguistic, literary, and social affordances/ annotations that result when learners engage in social reading in a virtual environment?

We used the lme4 package (Bates, Maechler, Bolker, & Walker, 2015) in R (R Core Team, 2017) to perform a linear mixed effects analysis of the relationship between literary, linguistic, and social affordances and text difficulty. As fixed effects, we entered K1, TTR (without interaction terms), and professor ratings of difficulty (Prof_Diff) into the model. As random effects, we had an intercept for subjects (Cunnings, 2012). Visual inspection of residual plots did not reveal any obvious deviations from homoscedasticity or normality (Baayen, Davidson, & Bates, 2008).

The mixed methods approach was chosen because it allows the means for each subject to vary. Simply put, by allowing the means for each subject to vary, we are able to account for random differences between subjects that may occur. Given the nature of L2 development and the diverse approaches of L2 readers, it has been argued that SLA researchers should use mixed effects analysis more often (Cunnings, 2012).

To test if text difficulty was associated with literary, linguistic, or social affordances produced while annotating poems in Hylighter, we first created a null model for each of our dependent variables. The null model consisted of the random effect of subjects and the fixed effect of Week. We then created a full model by adding our fixed effects of interest, which measured text difficulty: K1, TTR, and Professor difficulty scores. The full model was then compared to the null model using an ANOVA test. Both the full models for literary ($\chi^2(3) = 13.23, p < .01$) and linguistic comments ($\chi^2(3) = 11.48, p = .01$) were significantly different from the null models, however the full model for social comments ($\chi^2(3) = 2.39, p = .49$) was not significantly different from the null model. In other words, the relationship between text difficulty and the social affordances that emerged in our data was statistically insignificant. Table 2 below provides a summary of the full models.

Table 2. Regression coefficients

	Results		
	<i>Dependent variable:</i>		
	Literary_Total (1)	Linguistic_Total (2)	Social_Total (3)
Week	0.155*** (0.066, 0.244)	-0.011 (-0.048, 0.025)	0.0004 (-0.105, 0.105)
K1	-1.930 (-3.920, 0.060)	1.220** (0.408, 2.033)	1.296 (-1.041, 3.653)
TTR	-2.224*** (-3.457, -0.992)	0.484 (-0.019, 0.987)	0.985 (-0.463, 2.451)

Prof_Diff	-0.014 (-0.045, 0.016)	-0.007 (-0.020, 0.005)	-0.005 (-0.040, 0.031)
Constant	3.520*** (1.438, 5.602)	-1.067** (-1.917, -0.217)	-0.746 (-3.217, 1.699)
Model Fit (Chi Sq)	.004**	.001**	.496
Observations	562	562	562

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Literary Annotations/Affordances

Poems with a one-unit increase in TTR are associated with a decrease in the average amount of literary annotations/affordances made by 2.224 comments per observation. In other words, as the lexical complexity of the poems increased, the literary annotations/affordances made by the students decreased as illustrated in Figure 2.

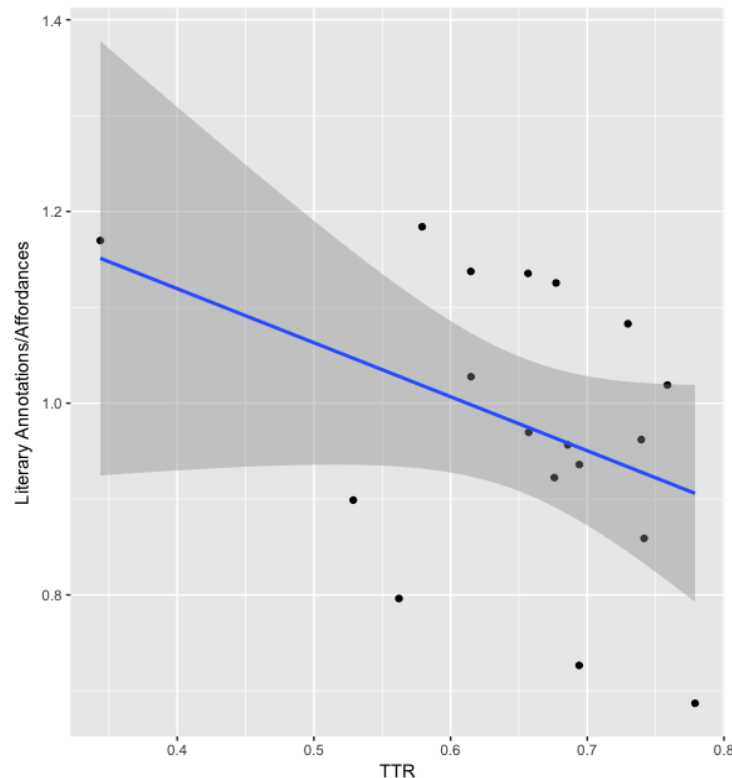


Figure 2. Relationship between TTR and literary annotations/affordances

Linguistic Annotations/Affordances

An increase in K1 resulted in a 1.220 increase in linguistic annotations/affordances made by students (see Figure 3). This is to say that poems with more words in the top 1000 most frequent word list are associated with more linguistic comments. This is an interesting finding in that, on one hand, one would expect that a higher K1 value would suggest more

familiar vocabulary and thus fewer linguistically related annotations/affordances. Alternatively, one could argue that more frequent/common words in the poem (again, via the K1 measure) could result in students understanding more of the poem thereby leading to more fine-tuned, linguistic-based comments.

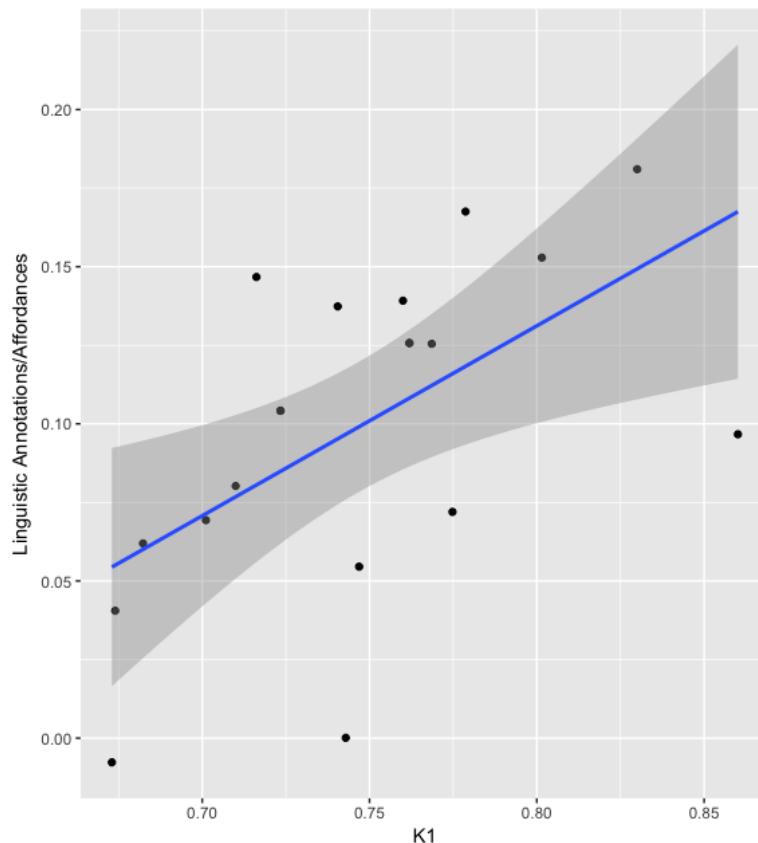


Figure 3. Relationship between K1 and linguistic annotations/affordances

That said, it is worth noting that the nature of the 42 linguistic annotations/affordances in the study were not merely questions posed to fellow students asking about word meaning or posing grammar questions; only 13 of the 42 linguistic annotations dealt with these kinds of purely linguistic inquiries. Rather, the majority of linguistic annotations/affordances identified in the study (i.e., 29 out of 42) included students referencing a specific word and then inquiring about how it contributes to the overall literary meaning of the poem. That is, even though our statistical analyses indicate that as the more frequent vocabulary words in Spanish were found in a poem (i.e., via the K1 metric) more linguistic affordances emerged in students' annotations, and these linguistic affordances were almost always accompanied by a literary annotation/affordance. To illustrate the complexity of students' linguistic annotations and how they emerged in tandem with a literary annotated comment, we present a purposive sample (Robson, 2011) from our data.

Excerpt 1. Illustration of linguistic affordance coupled with a literary affordance

Poem fragment highlighted by Tate: *Un ataúd con ruedas es la cama* [A coffin with wheels is a bed]

Tate: *¿Alguien puede interpretar la metáfora esa? Me llamó la atención pero no sé realmente que está diciendo.*

[Can someone interpret this metaphor? It got my attention, but I don't really know what it is saying.]

Beth: *Tate, creo que esta metáfora está hablando de las procesiones funerales. El ataúd significa "coffin." Como hoy, cuando uno se muere lo meten en un vehículo para llevarlo al cementerio: así era algunos siglos atrás también pero usaban un caballo y una carreta para llevar la persona a su entierro.*

[Tate, I think that this metaphor is talking about funeral processions. *El ataúd* means "coffin." Like today, when one dies they put them in a vehicle to take them to the cemetery: this is what it was also like centuries ago but they used a horse and cart to take the person to their burial.]

Tim: *Estoy de acuerdo con Tate en su análisis del ataúd. Pero también el uso de la palabra "cama" puede hacer referencia a la palabra "sábana" del verso 3. Tienen esta imagen similar, pero tonos que se contrastan. Uno habla del niño y la blancura (inocencia, pureza), y el segundo de la muerte. Esta antítesis da énfasis a que Ignacio murió joven, como un niño inocente, antes de llegar a una edad avanzada.*

[I agree with Tate in his analysis of *ataúd*. But also the use of the word "bed" can make reference to the word "sheets" in verse 3. They have this same image, but tones that contrast each other. One talks about a child and whiteness (innocence, purity), and the second one talks about death. This antithesis gives emphasis to the fact that Ignacio died young, like an innocent child, before arriving to an advanced age.]

In Excerpt 1, Tate highlights a metaphor in the poem and asks if anyone can help him understand what it means. Beth's response to Tate first offers an initial interpretation of the metaphor. She then provides a translation of one of the words used in the metaphor (i.e., *ataúd*/coffin) before expanding on her interpretation of the poet's intentions of using this metaphor. Another student, Tim, responds to Beth's annotation by citing other words in the poem (i.e., *cama*/bed and *sábana*/sheet) that are used in reference to *ataúd* along with indicating where they are employed (i.e., "...in verse 3"). Like Beth, Tim then goes on to offer an interpretation of how and why the two words contrast each other, referencing a rhetorical device (i.e., *antítesis*) used by the poet. Again, this representative sample of the emergence of linguistic affordances alongside literary affordances in learners' annotations illustrates the complex nature of learners' literacy practices in an L2 reading environment as they relate to text difficulty measures. The implications of the aforementioned results for research question 1 will be further explored in the discussion section below.

Research Question 2. What is the nature of learners' digital writing practices in terms of the emergence of linguistic, literary, and social affordances when interacting in an L2 social reading space?

To understand how the three different affordances emerged in learners' written annotations while interacting and commenting on the L2 poems in Hylighter over the course of the four weeks, we first analyzed all annotations (i.e., original comments and replies) and calculated the total number of affordances that appeared by themselves (i.e., a 'Single' is one type of affordance in an annotation), together (i.e., a 'Double' constitutes two affordance types in an annotation), or with two other affordances (i.e., a 'Triple' is when all three affordance types

appeared in an annotation). As can be seen in Table 3, a single type of affordance appeared 68% of the time in students' written annotations while two different kinds of affordances emerged 30% of the time. Only 2% of the written annotations included all three affordances.

Table 3. Frequency of single, double, and triple affordances in written annotations

	Week 1	Week 2	Week 3	Week 4	Total for all 4 Weeks
Single	98	117	86	82	383 (68%)
Double	33	43	45	48	169 (30%)
Triple	1	3	3	3	10 (2%)
Total # of Affordances	132	163	134	133	562

What is interesting to note is that triple affordances observed in learners' written annotations were infrequent throughout all four weeks. Furthermore, there was little fluctuation over the course of the study regarding the number of triple affordances found in learners' annotations. In contrast, the number of single affordances was highest during the first two weeks of the study but then trended downward during the latter part of the project. In contrast, the emergence of two affordances in learners' written annotations steadily increased over the course of the study. Figure 4 charts the number of single, double, and triple affordances located in each of the 15 learners' written annotations over the data collection period. In many learners' annotations, the emergence of two affordances becomes more apparent later in the data collection period.

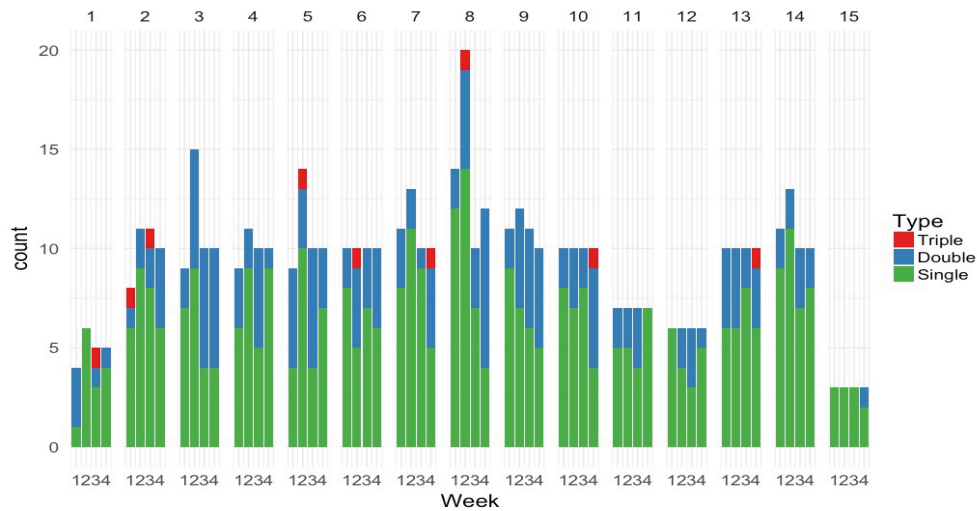


Figure 4. Single, double, and triple affordances in learners' written annotations

To better understand the nature of two affordances emerging in a single written annotation, we calculated the possible combinations. Table 4 shows that of the 169 double affordances found in our data over the course of the four weeks, only four were composed of a social and a linguistic affordance, ten were made up of a literary and linguistic

affordance, while 155 were comprised of a literary and social affordance.

Table 4. Types of double affordances in learners' writing over the four weeks

	Total
Social + Linguistic	4
Literary + Linguistic	10
Literary + Social	155

Given the fact that literary and social affordances co-occurred more often than any other pair of affordances, we provide a representative sample that illustrates this combination. In Excerpt 2, the first student in the interaction (Joe) highlights a phrase from a poem by Federico García Lorca and provides an initial written comment that first mentions the use of a rhetorical device (i.e., *paradoja*). After identifying the literary device, Joe goes on to provide an interpretation of Lorca's phrase and the paradox of 'hot ice'. However, while offering his interpretation, Joe repeats his ideas. Much of his written annotation is considered to be a literary affordance in that he is identifying a rhetorical device and providing an interpretation of its meaning. In the last two sentences of his written annotation, however, Joe indicates that he isn't sure if he is clearly explaining his ideas and states that he hopes someone understands what he wants to say and can explain it better. This final part of his written annotation constitutes a social affordance in that it is indicating a personal reaction to his own interpretation while also overtly soliciting the help of any other student in the class.

The excerpt ends with another student (Tracy) replying to Joe's original comment by agreeing with everything he has written, thereby reaffirming his interpretation and providing him with support for his ideas. In essence, Tracy is responding to both the social and literary affordances in Joe's initial written annotated comment. Again, this example of a written annotation that contains a literary and social affordance was representative of how learners simultaneously offered a literary interpretation of the L2 poems while also socially engaging with and supporting each other in the digital reading environment.

Excerpt 2. Illustration of literary affordance coupled with a social affordance

Poem fragment highlighted by Joe: *caliente voz de hielo* [hot voice of ice]

Joe: *La paradoja de hielo caliente es interesante. Me hace pensar en un hielo tan frío que se siente caliente. Por ejemplo hielo seco (Dry Ice), al tocarlo, se siente caliente o como si le está quemando. Lo interpreto así, la voz caliente puede ser que su voz le hace sentir un calor inmenso, sus palabras le queman y puede sentirlo en su corazón como un sentimiento, pero a la vez es de hielo porque su amante es tan frío. Al mismo tiempo que las palabras le hace sentir un sentimiento bueno y caliente, las palabras le duelen porque vienen de una persona fría. No me explico bien pero tiene sentido en mi mente. Ojalá alguien puede entender lo que quiere decir y explicarlo mejor.*

[The paradox of hot ice is interesting. It makes me think about ice that is so cold that it feels hot. For example, dry ice (Dry Ice), upon touching it, feels as if it is burning you. I interpret it like that, the hot voice could be that his voice makes one feel an intense heat, his words burn you, and you can feel it in your heart like a feeling, but at the same time it is ice because his lover is so cold. While the words make you feel good and hot, the

words hurt you because they are coming from a cold person. I'm not explaining myself very well, but it makes sense in my mind. I really hope that someone understands what I want to say and can explain it better.]

Tracy: *Me encanta tu interpretación. Tiene mucho sentido y da una imagen a lo que dice el poema. Es cierto que hielo puede parecer caliente y como has dicho parece que su amante tiene una voz o palabras tan frías que queman el alma y causan dolor.*

[I love your interpretation. It makes a lot of sense and it provides an image to what the poem is saying. It is true that ice can seem hot and like you have said, it seems his lover has a voice or words so cold that they burn his soul and cause pain.]

In addition to analyzing the ways in which the three affordances emerged in learners' annotations, other interesting features were identified in the data that help to gain a better understanding of the nature of learners' digital writing practices in a social reading environment. While learners primarily used their L2 to interact with each other while in Hylighter, we observed that learners codeswitched and used English on 20 different occasions over the course of the four-week study. The majority of the time, students used their L1 while providing a definition of a word for the rest of the class or when answering a particular learner's vocabulary question. Other uses of the L1 involved the use of exclamatory expressions such as 'Yes, Michael,' 'Wow,' and 'Whoa,' one student citing something they had read by the German philosopher Heidegger that helped her understand the meaning of a poem, and another student relating one of the themes of a poem to a film that described how life and death are treated in Mexican culture.

Finally, we noted seven instances of learners incorporating links to external websites in their written annotations that served to either facilitate their literary interpretations or support their answers to linguistic (i.e., vocabulary) questions from other students. Four of the links in learners' written annotations directed fellow learners to online dictionaries (e.g., <http://www.spanishdict.com/>, dle.rae.es), two students linked to websites that contained relevant images, and one student linked to a YouTube video. Excerpts 3 and 4 illustrate learners incorporating links either to an online dictionary whenever a question arose regarding the definition of a word or to images that helped explain their ideas about a particular word, phrase, or stanza in a poem.

Excerpt 3. Sample use of a link to online dictionary

Poem fragment highlighted by Mike: *Un poeta de veinte años diría que es el auriga del amanecer* [A twenty year-old poet would say that he is the charioteer of the morning]

Mike: *Se hace referencia al auriga mencionado aquí? Como puede que una constelacion compara a un joven?*

[What is being referenced with charioteer here? How can a constellation be compared to a young person?]

Billy: <http://lema.rae.es/drae/?val=auriga> *Auriga, de acuerdo con google translate y la Real Academia española, quiere decir "Charioteer" Así que, traducido al inglés, la frase dice "he is the charioteer of the morning" que da la imagen de que este jardinero "rides the morning" o que es el que va adelante, el primero, el líder, el indicado. Puede hacer referencia al hecho de que los jardineros levantan muy temprano en la mañana para irse a trabajar, ya que el sol y el calor hace mas difícil su trabajo, y literalmente, estan*

ya trabajandos cuando el sol sale. O puede hacer referencia a que el jardinero, a hacer su trabajo sencillo, pero noble, y para el poeta, importante y mejor que los demas, es el mejor ejemplo, y un lider entre el pueblo.

[<http://lema.rae.es/drae/?val=auriga> Auriga, according to google translate and the royal academy of Spanish, means “Charioteer.” Therefore, when translated to English, the phrase says “he is the charioteer of the morning” which provides the image of this gardener who “rides the morning” or that it is him who goes forward, the first, the leader, the one who is indicated. This could be a reference to the fact that gardeners get up very early in the morning to go to work, given that the sun and the heat makes it more difficult to do their job, and literally, they are working when the sun comes up. Or, it could reference that the gardener doing his simple, yet noble, work, and for the poet, important and better than others, is the best example, and a leader among the people.]

In Excerpt 3, Mike highlights a phrase from a poem and then poses two questions about it to the rest of the class. Billy responds to Mike’s questions by first providing a definition of the word *auriga* [which means ‘charioteer’ but is also the name of a particular constellation of stars]. He first references Google and then provides a link to the definition of the word via the dictionary webpage of the Royal Academy of Spanish. He then goes on to provide his interpretation of what the poet intended to express. It is worth noting that this excerpt also illustrates the mixing of both the L1 and L2 when the student shares his ideas about the possible meaning of the verse.

Excerpt 4. Sample use of a link to an image

Poem fragment highlighted by Sarah: *Dile a la luna que venga, que no quiero ver la sangre de Ignacio sobre la arena* [Tell the moon to come, because I don’t want to see Ignacio’s blood on the sand]

Sarah: *La luna es un símbolo que representa la noche y la oscuridad. Quiere que sea noche para que puede dormir y tratar de no sufrir cómo está sufriendo ahora. También puede ser que quiere que sea noche para no ver la sangre. Cuando es noche no se puede ver la sangre por la oscuridad. Es cómo que la oscuridad esconde lo que no quiere ver.*

[The moon is a symbol that represents the night and darkness. He wants it to be nighttime so that he can sleep and try not to suffer like he is suffering now. It could also be that he wants it to be nighttime so that he doesn’t see the blood. When it is nighttime, you can’t see the blood due to the darkness. It’s like the darkness hides what he doesn’t want to see.

Kim: *Me gusta tu idea. Estoy de acuerdo que quiere que sea la noche para poder dormir y olvidar. También he leído que la luna y las sauces tiene magia. El sitio dice “Obrar magia que combine la Luna, el agua y el sauce crea una especie de trinidad mágica.” como el sauce está mencionado en la siguiente estrofa no sé si Lorca quería transmitir algo con esto?*
<http://www.taringa.net/post/ecologia/15482385/El-arbol-sauce-y-su-significado.html>

[I like your idea. I agree that he wants it to be nighttime in order to sleep and forget. I have also read that the moon and willow trees are magical. The website says “Working magic that combines the moon, water, and the willow tree creates a kind of magical trinity.” like the willow tree mentioned in the next stanza. I don’t know if Lorca was wanting to transmit something with this? <http://www.taringa.net/post/ecologia/15482385/El->

[arbol-sauce-y-su-significado.html](#)]

Excerpt 4 shows an interaction between two students who discuss the symbolism of the moon/darkness that is referenced in a verse from Lorca's poem *La Sangre Derramada* [Spilled Blood]. In response to Sarah's interpretation, Kim responds and indicates that she likes and agrees with Sarah's perspectives on the meaning of the verse. Kim then goes on to provide her own understanding of the symbolism of the moon by referencing something she had read on a website that talks about how in Greek mythology, the moon, water, and willow trees are considered to be a 'magical trinity'. While commenting on the symbolic/magical aspects of the moon, she provides a link to a website called *Taringa* (a popular social media website in Latin America) that has an image of a willow tree along with a short narrative in Spanish explaining the origins of the aforementioned 'magical trinity' (see Figure 5 for a screenshot from the website). The relevance of the ability of learners to include links such as those illustrated in Excerpts 3 and 4 in digital reading environments is discussed below.



Figure 5. Screenshot from the Taringa website used to illustrate a willow tree and reference its magical powers¹

DISCUSSION AND CONCLUSION

This exploratory study represents an attempt to empirically investigate aspects of learners'

¹ NOTE: Original image of tree by 'Jdforrester' (<https://commons.wikimedia.org/wiki/File:Willow.jpg>); Spanish text/description by Taringa user 'Sauce111.'

digital literacy practices when engaged in L2 social reading in a virtual environment. From a theoretical perspective, participating in social reading via DATs in an advanced-level L2 learning context can bring about the emergence of literary, linguistic, and social affordances (Thoms & Poole, 2017). These affordances represent possible learning opportunities for learners if they are engaged with each other and with the digitized texts in these environments. As such, active learners in virtual and open contexts can create and benefit from the various learning opportunities provided by DATs. However, we have seen that factors not related to the learner, such as the difficulty of the texts themselves, can contribute to an increase or decrease of certain kinds of affordances in a social reading environment. Specifically, we have seen that the increasing lexical diversity of the poems (via the TTR measure) in this study resulted in a decrease of the literary affordances that emerged in students' annotations. From a pedagogical point of view, if an L2 instructor wants students to engage more with each other about the literary aspects of a poem in a digital social reading environment, this may mean that instructors should be more cognizant of the lexical features of a text. For example, she might highlight and define some of the more difficult words upfront (i.e., either outside of or within the virtual environment), before having students interact with each other in the DAT.

With respect to learners engaging with each other about linguistic aspects of the Hispanic poems while reading and annotating in Hylighter, one interesting finding in the data was that if a poem contained easier words (i.e., as measured via the K1 variable), this resulted in an increase of the number of linguistic affordances. However, as we illustrated in Excerpt 1, the nature of the linguistic affordances often involved learners noting a specific word used in conjunction with a rhetorical device. That is, the linguistic affordances in our data were frequently couched in a larger, literary-oriented explanation about the poem.

We also observed that whenever two or more affordances appeared in students' written annotations, they primarily involved a social and literary affordance. In addition, the presence of these two types of affordances in students' written annotations steadily increased over time. It is possible to conclude that this feature of students' writing practices in our study is a reflection of the unique digital social reading environment afforded by DATs, contexts in which literary interpretations and informal, social-media-like interactions can naturally coexist. Allowing learners the opportunity to integrate and simultaneously develop their social and literary competencies in the L2 via literary-cultural texts reflects the tenets of a pedagogy of multiliteracies that "emphasizes textual interpretation and transformation, the interdependence of language modalities, and interactions among language forms, social context, and communication" (Paesani, 2016, p. 270). That is, our data suggest that digital social reading environments are contexts that allow for the emergence and integration of a variety of affordances that, together, help learners make meaning from texts.

We have also seen that there were a number of instances in students' written annotations where students relied on other semiotic resources when annotating the texts in Hylighter, such as the inclusion of images or links to websites to complement their linguistic and/or literary insights. In addition, learners also occasionally codeswitched and used their L1 to convey their literary interpretations, share linguistic information with fellow students, or socially express solidarity with and support for each other. This mixing and use of a variety of semiotic resources when interpreting a literary text is difficult if not impossible via traditional, face-to-face discussions that take place in many physical L2 literature classrooms. The development and use of a number of different semiotic resources that result from interactions among learners in digital social reading environments like Hylighter reflect "a

new conceptualization of literacies as multiple, dynamic, dialogic, and situated” (Ware, Kern, & Warschauer, 2016, p. 308). In other words, digital social reading environments have the potential to re-conceptualize traditional notions of literacy via the integration of academic practices (e.g., close reading) with more vernacular literacy practices (e.g., the inclusion of links and images in students’ annotated comments/posts as well as the social affordances observed in our study).

That said, pedagogical concerns remain that need to be addressed moving forward. Specifically, developing learners’ open, digital literacy practices is often viewed as replacing print-based practices. Blyth (2014) suggests that this perspective is flawed in that “print culture is not being replaced by digital culture as many teachers may think; instead, literacy culture as a whole is becoming more participatory” (p. 222). The current challenge for many L2 instructors is to meaningfully include tasks that require the development of digital literacy practices, such as L2 social reading, alongside the traditional skill-oriented development goals and activities currently found in many L2 language learning courses/curricula. A pedagogy of multiliteracies—especially one that incorporates language learning in digital environments like DATs—not only unifies “the study of language and the study of literary-cultural content” (Paesani, Allen, & Dupuy, 2016, p. 22), but has the potential to meaningfully combine skill-based activities and digital literacy practices via the incorporation of a variety of semiotic resources (e.g., embedding images or linking to online dictionaries to further clarify a student’s understanding of a particular rhetorical device, word, or grammatical structure). To that end, much more empirical work is needed that investigates how learner-, text-, and context-based factors affect the ways in which learners develop their L2 digital literacies along with explorations of the pedagogical approaches and principles that would facilitate this process (Kern, 2015). This study represents a step towards that endeavor.

Limitations of Study & Future Avenues of Research

This study has a number of limitations. As previously mentioned, some of the statistical analyses used would benefit from having more data from a greater number of students. In addition, we did not carry out any assessment of individual students’ overall proficiency in Spanish. These additional student data points would have helped to better understand how L2 proficiency affects the ways in which students annotate the texts, interact with and react to fellow students in the social reading environment, and to better understand the nature of writing practices of different groups of students. In addition, having students’ input regarding the difficulty level of the 18 poems used in the study would have provided yet another variable to consider in our statistical analyses. Finally, we did not carry out an analysis of the relationship between the four prompts provided by the instructor each week and students’ written annotations. Understanding how reading prompts might affect the type and quantity of affordances that emerge in students’ written annotations would provide a more complete picture of how learners engage with each other and the digital texts in a social reading environment.

Given that so few studies on social reading have been carried out to date, much empirical work is needed on a number of issues. In particular, more studies are needed that involve a wide range of L2s other than EFL learners. For example, one possible project could investigate the benefits and challenges for learners and practitioners of incorporating digital social reading in logographically based language courses (e.g., Mandarin) and in other, less-commonly taught language classrooms. A second area of investigation should focus on a

better understanding of how the amount and types of annotations made by students affect L2 learners' reading comprehension. In other words, it is still not clear how social reading affects both immediate and delayed reading comprehension of L2 learners when compared to more traditional, solitary L2 reading experiences. Third, additional literary genres along with different proficiency levels of learners should be explored in future work. Finally, future projects should carefully consider the relationship between students' online interactions via their annotations carried out in a DAT with subsequent whole-class discussions among students and instructor in the physical classroom. Determining whether or not the virtual discussions carried out in DATs improve whole-class discussions may enhance learners' comprehension of the literary texts and potentially facilitate L2 acquisition.

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REFERENCES

- Allen, H., & Paesani, K. (2010). Exploring the feasibility of a pedagogy of multiliteracies in introductory foreign language courses. *L2 Journal*, 2(1), 119–142.
- Auyang, S. (2000). *Mind in everyday life and cognitive science*. Cambridge, MA: MIT Press.
- Baayen, R., Davidson, D., & Bates, D. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language*, 59(4), 390–412.
- Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1–48.
- Bernhardt, E. (2011). *Understanding advanced second-language reading*. New York, NY: Routledge.
- Blyth, C. (2014). Exploring the affordances of digital social reading for L2 literacy: The case of eComma. In J. Pettes Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (pp. 201–226). San Marcos, TX: CALICO.
- Brandl, K. (2008). *Communicative language teaching in action: Putting principles to work*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Brantmeier, C. (2013). Acquisition of reading in second language Spanish. In K. Geeslin (Ed.), *The handbook of Spanish second language acquisition* (pp. 466–481). Hoboken, NJ: Wiley-Blackwell.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Byrnes, H., Crane, C., Maxim, H., & Sprang, K. (2006). Taking text to task: Issues and choices in curriculum construction. *ITL: International Journal of Applied Linguistics*, 152, 85–110.
- Chang, C., & Hsu, C. (2011). A mobile-assisted synchronously collaborative translation–annotation system for English as a foreign language (EFL) reading comprehension. *Computer Assisted Language Learning*, 24(2), 155–180.
- Chen, C., Wang, J., Chen, Y., & Wu, J. (2016). Forecasting reading anxiety for promoting English-language reading performance based on reading annotation behavior. *Interactive Learning Environments*, 24(4), 681–705.
- Chun, D. (2016). The role of technology in SLA research. *Language Learning & Technology*, (20)2, 98–115.
- Chun, D., Kern, R., & Smith, B. (2016). Technology in language use, language teaching, and language learning. *The Modern Language Journal*, 100(1), 64–80.
- Cope, B., & Kalantzis, M. (2009). 'Multiliteracies': New literacies, new learning. *Pedagogies*, 4(3), 164–194.
- Crossley, S., Allen, L., Kyle, K., & McNamara, D. (2014). Analyzing discourse processing using a simple natural language processing tool (SiNLP). *Discourse Processes*, 51, 511–534.
- Cunnings, I. (2012). An overview of mixed-effects statistical models for second language researchers. *Second Language Research*, 28(3), 369–382.
- Darhower, M. (2008). The role of linguistic affordances in participation in a bilingual telecollaboration. *CALICO Journal*, 26, 48–69.
- Davis, E. (1970). *Selected works of literature and readability* (Unpublished doctoral dissertation). University of

- Michigan, Ann Arbor, MI.
- Gao, F. (2013). A case study of using a social annotation tool to support collaborative learning. *Internet and Higher Education*, 17, 76–83.
- Gibson, J. (1979). *The ecological approach to visual perception*. Hillsdale, NJ: Lawrence Erlbaum.
- Grabe, W., & Stoller, F. (2011). *Teaching and researching reading* (2nd ed.). New York, NY: Routledge.
- Hafner, C., Chik, A., & Jones, R. (2015). Digital literacies and language learning. *Language Learning & Technology*, 19(3), 1–7.
- Hall, J. (2001). *Methods for teaching foreign languages: Creating a community of learners in the classroom*. Upper Saddle River, NJ: Prentice Hall.
- Hoven, D., & Palalas, A. (2015). Ecological constructivism as a new learning theory for MALL: An open system of beliefs, observations and informed explanations. In A. Palalas & M. Ally (Eds.), *The international handbook of Mobile-Assisted Language Learning* (pp. 113–137). Beijing, China: China Central Radio & TV University Press.
- Huang, H., Chern, C., & Lin, C. (2009). EFL learners' use of online reading strategies and comprehension of texts: An exploratory study. *Computers & Education*, 52(1), 13–26.
- Jeong, A. (2003). The sequential analysis of group interaction and critical thinking in online threaded discussions. *The American Journal of Distance Education*, 17(1), 25–43.
- Kern, R. (2000). *Literacy and language teaching*. Oxford, England: Oxford University Press.
- Kern, R. (2003). Literacy as a new organizing principle for foreign language education. In P. C. Patrikis (Ed.), *Reading between the lines: Perspectives on foreign language literacy* (pp. 40–59). New Haven, CT: Yale University Press.
- Kern, R. (2015). *Language, literacy, and technology*. New York, NY: Cambridge University Press.
- Kiili, C., Laurinen, L., Marttunen, M., & Leu, D. (2012). Working on understanding during collaborative online reading. *Journal of Literacy Research*, 44(4), 448–483.
- Klare, G., & Buck, B. (1954). *Know your reader: The scientific approach to readability*. New York, NY: Hermitage House.
- Lafford, B. (2009). Toward an ecological CALL: Update to Garrett (1991). *The Modern Language Journal*, 93(s1), 673–696.
- Lankshear, C., & Knobel, M. (2008). Introduction: Digital literacies—Concepts, policies and practices. In C. Lankshear & M. Knobel (Eds.), *Digital literacies: Concepts, policies and practices* (pp. 1–16). New York, NY: Peter Lang.
- Lebow, D. (2012). Hylighter [Data Annotation Tool/Software]. Available from <http://www.hylighter.com/hybar/site/index.html>.
- Lo, J., Yeh, S., & Sung, C. (2013). Learning paragraph structure with online annotations: An interactive approach to enhancing EFL reading comprehension. *System*, 41(2), 413–427.
- Lu, J., & Deng, L. (2013). Examining students' use of online annotation tools in support of argumentative reading. *Australian Journal of Educational Technology*, 29(2), 161–171.
- Maxim, H. (2014). Curricular integration and faculty development: Teaching language-based content across the FL curriculum. In J. Swaffar & P. Urlaub (Eds.), *Transforming postsecondary foreign language teaching in the United States* (pp. 79–101). New York, NY: Springer.
- Mendenhall, A., & Johnson, T. (2010). Fostering the development of critical thinking skills and reading comprehension of undergraduates using a web 2.0 tool coupled with a learning system. *Interactive Learning Environments*, 18(3), 263–276.
- Mercer, N., Littleton, K., & Wegerif, R. (2004). Studying the processes of interaction and collaborative activity in computer-based educational activities. *Technology Pedagogy and Education*, 13(2), 195–212.
- Meyers, E., Erickson, I., & Small, R. (2013). Digital literacy and informal learning environments: An introduction. *Learning, Media, and Technology*, 38(4), 355–367.
- Michelson, K., & Dupuy, B. (2014). Multi-storied lives: Global simulation as an approach to developing multiliteracies in an intermediate French course. *L2 Journal*, 6(1), 21–49.
- Miller, P. (2005). *Ecological interaction in ESL writing: Perceiving and acting on affordances for self-regulation in discourse and grammar* (Unpublished doctoral dissertation). Indiana University of Pennsylvania, Indiana, PA.
- New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, 66(1), 60–92.
- Nor, N., Azman, H., & Hamat, A. (2013). Investigating students' use of online annotation tool in an online reading environment. *3L: The Southeast Asian Journal of English Language Studies*, 19(3), 87–101.
- Paesani, K. (2016). Investigating connections among reading, writing, and language development: A multiliteracies perspective. *Reading in a Foreign Language*, 28(2), 266–289.

- Paesani, K., Allen, H., & Dupuy, B. (2016). *A multiliteracies framework for collegiate foreign language teaching*. New York, NY: Pearson.
- Pratt, M., Geisler, M., Kramsch, C., McGinnis, S., Patrikis, P., Ryding, K., & Saussy, H. (2007). *Foreign languages and higher education: New structures for a changed world*. New York, NY: The Modern Language Association of America.
- R Core Team. (2017). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.
- Robson, C. (2011). *Real world research: A resource for social research in applied settings* (3rd ed.). Malden, MA: Wiley-Blackwell.
- Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 97–114). New York, NY: Oxford University Press.
- Thoms, J. (2014). An ecological view of whole-class discussions in a second language literature classroom: Teacher reformulations as affordances for learning. *The Modern Language Journal*, 98, 724–741.
- Thoms, J., & Poole, F. (2017). Investigating linguistic, literary, and social affordances of L2 collaborative reading. *Language Learning & Technology*, 21(2), 139–156.
- Thoms, J., Sung, K., & Poole, F. (2017). Investigating the linguistic and pedagogical affordances of an L2 open reading environment via *eCommra*: An exploratory study in a Chinese language course. *System*, 69, 38–53.
- Tseng, S., Yeh, H., & Yang, S. (2015). Promoting different reading comprehension levels through online annotations. *Computer Assisted Language Learning*, 28(1), 41–57.
- van Lier, L. (2000). From input to affordance: Social-interactive learning from an ecological perspective. In J. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 245–259). New York, NY: Oxford University Press.
- van Lier, L. (2004). *The ecology and semiotics of language learning: A sociocultural perspective*. Boston, MA: Kluwer Academic Publishers.
- Wals, M., Washburn, K., Glenn, N., & Graham, R. (2013, August 12). *Spanish vocabulary online profiler (SVOP): A linguistic tool for literacy and second language acquisition*. <http://jur.byu.edu/?p=1728>.
- Ware, P., Kern, R., & Warschauer, M. (2016). The development of digital literacies. In R. Manchón & P. Matsuda (Eds.), *Handbook of second and foreign language writing* (pp. 307–328). Berlin, Germany: Mouton De Gruyter.
- Yang, X., Yu, S., & Sun, Z. (2013). The effect of collaborative annotation on Chinese reading level in primary schools in China. *British Journal of Educational Technology*, 44(1), 95–111.
- Yeh, H., Hung, H., & Chiang, Y. (2017). The use of online annotations in reading instruction and its impact on students' reading progress and processes. *ReCALL*, 29(1), 22–38.
- Young, A., & Bowers, P. (1995). Individual differences and text difficulty determinants of reading fluency and expressiveness. *Journal of Experimental Child Psychology*, 60, 428–454.
- Yu, L. (2014). *Using online annotations in collaborative reading activities with elementary-aged Taiwanese learners of English* (Unpublished doctoral dissertation). University of Texas, Austin, TX.
- Zarzour, H., & Sellami, M. (2017). A linked data-based collaborative annotation system for increasing learning achievements. *Educational Technology Research and Development*, 65(2), 381–397.

APPENDIX A. POEMS READ BY STUDENTS IN HYLIGHTER

Poem	Poet
<i>La cogida y la muerte</i> (from <i>Llanto por Ignacio Sánchez Mejías</i>)	Federico García Lorca
<i>La sangre derramada</i> (from <i>Llanto por Ignacio Sánchez Mejías</i>)	Federico García Lorca
<i>Cuerpo presente</i> (from <i>Llanto por Ignacio Sánchez Mejías</i>)	Federico García Lorca
<i>Más allá</i> (from <i>Cántico</i>)	Jorge Guillén
<i>Naturaleza viva</i> (from <i>Cántico</i>)	Jorge Guillén

<i>Oda a la alcachofa</i> (from <i>Odas</i>)	Pablo Neruda
<i>Oda a una castaña en el suelo</i> (from <i>Odas</i>)	Pablo Neruda
<i>Oda al tomate</i> (from <i>Odas</i>)	Pablo Neruda
<i>Oda a los calcetines</i> (from <i>Odas</i>)	Pablo Neruda
<i>Oda a la bicicleta</i> (from <i>Odas</i>)	Pablo Neruda
<i>Oda a la jardinera</i> (from <i>Odas</i>)	Pablo Neruda
<i>Alguien me habla de una biblioteca</i> (from <i>Un ángulo me basta</i>)	Juan Antonio González Iglesias
<i>Tiene mi misma edad</i> (from <i>Un ángulo me basta</i>)	Juan Antonio González Iglesias
<i>Soneto de la dulce queja</i> (from <i>Sonetos del amor oscuro</i>)	Federico García Lorca
<i>Llagas de amor</i> (from <i>Sonetos del amor oscuro</i>)	Federico García Lorca
<i>El poeta dice la verdad</i> (from <i>Sonetos del amor oscuro</i>)	Federico García Lorca
<i>Ay voz secreta del amor oscuro</i> (from <i>Sonetos del amor oscuro</i>)	Federico García Lorca
<i>Noche del amor insomne</i> (from <i>Sonetos del amor oscuro</i>)	Federico García Lorca

APPENDIX B. SAMPLE MINI-ANALYSIS TASK USED IN STUDY

NOTE: The following prompt was written entirely in Spanish for the students. For the purposes of this article (and when appropriate), we have translated it to English.

Homework
Neo-Folklorism and the Elegy:
Llanto por Ignacio Sánchez Mejías



Homework: Federico García Lorca, *Llanto por Ignacio Sánchez Mejías*

Read and comment on the four sections from *Llanto por Ignacio Sánchez Mejías* via the digital forum Hylighter established by Prof. X. When commenting, consider the questions that appear below. Cite sections from the texts to support your ideas. **There is not a mini-analysis assignment to do this week, but your comments in Hylighter will be graded.**

1. Contemplate the main message or plot of each section of the poem.
2. Choose various metaphors and interpret them.
3. How is time and space represented in this poem? Determine what kinds of time and spaces are used in the work.
4. In what ways can we categorize this poem as a surrealist work?
5. Investigate what an elegy is. What are some of the characteristics of this poetic sub-genre? In what ways is Lorca's poem an elegy?

APPENDIX C. EXAMPLES OF LITERARY, SOCIAL, AND LINGUISTIC AFFORDANCES²

Sample literary affordance (identifying and interpreting a rhetorical device)

Fred's initial annotated comment: *En esta estrofa el poeta utiliza la metáfora para decir que ya no quiere sufrir y ser debil como las flores pero quiere convertir sus sufrimientos y dolores en algo duro y fuerte como el trigo.*

[In this stanza the poet utilizes a metaphor to say that he doesn't want to suffer anymore and be weak like flowers but he wants to convert his suffering and pain into something lasting and strong like wheat.]

Elva's reply: *Yo creo que es interesante como el poeta quiere convertir "en eterno monton de duro trigo." Un monton (pile) de trigo es algo preservado despues de la cosecha y puede durar mucho mas tiempo asi que seria posible si lo deja en el campo.*

[I think it's interesting how the poet wants to convert "an eternal mountain of hard wheat." A pile of wheat is something preserved after the harvest and can last a lot more like that than would be possible if he left it in the field.]

Sample social affordance (expressing an appreciation for a detail in the poem)

Thom's initial annotated comment: *Me gusta este idea de que el amor es la naturaleza.*

[I like this idea that love is nature.]

Margo's reply: *Es muy cierto que los sentimientos del amor son naturales. Me hace pensar en una canción de George Strait.*

[It is very true that feelings for love are natural. It makes me think of a song by George

² For fuller explanations/analyses of each of the three affordance types, see Thoms and Poole (2017).

Strait.]

Sample linguistic affordance (inquiring about the word *la madeja* or ‘head of hair’)

Lucas’s initial annotated comment: *No entendi esta palabra cuando la vi. La busque pero dijo que significa, “hank, or mop.” Alguien me puede entender que significa esta palabra de verdad?*

[I didn’t understand this word when I saw it. I looked for it but it told me that it means “hank, or mop.” Can someone help me understand what this word really means?]

Lincoln’s reply: *Segun WordReference, “madeja” significa un mane o head of hair tambien.*

[According to WordReference, “madeja” also means a mane or head of hair.]