

ANONYMITY AND MOTIVATION IN ASYNCHRONOUS DISCUSSIONS AND L2 VOCABULARY LEARNING

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This study investigates L2 attainment in asynchronous online environments, specifically possible relationships among anonymity, L2 motivation, participation in discussions, quality of L2 production, and success in L2 vocabulary learning. It examines, in asynchronous discussions, (a) if participation and (b) motivation contribute to L2 vocabulary learning, (c) if motivation is related to level of participation in anonymous versus nonanonymous discussions, and (d) if a student's quality of L2 use varies in anonymous vs. nonanonymous discussions. Data from 87 high school students enrolled in a cyber-charter school Spanish II course in the Eastern United States included a pre- and post-cloze, a vocabulary recognition test, e-documents retrieved from the asynchronous discussions, and demographic information and motivation surveys. Results revealed that students who participated in the asynchronous discussions received significantly higher scores on the post-test than those who did not. In terms of level of participation, nonanonymous forums may have a comparative advantage over anonymous ones for learners with high levels of *introjected* regulation, whereas for learners with high levels of *identified* regulation, both forums are advantageous. *Introjected* regulation was the only significant predictor of success in learning L2 vocabulary. Finally, nonanonymous forums seem to generate higher quality L2 production than anonymous ones.

Keywords: CALL, Anonymity Effect, Motivation, Vocabulary Learning, Asynchronous Discussions, Quality of L2 use

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INTRODUCTION

The evolution of internet and computer-mediated communication (CMC) has transformed the face of learning, making web-based environments a common choice in education. With rapidly increasing computer accessibility and internet popularity, K–12 educational settings are evolving to include public cyber schools as a common alternative to the classic brick-and-mortar classroom environment across the United States. According to the National Alliance for Public Charter Schools (2010), almost all states offer significant online learning opportunities for K–12 populations, with the number of public cyber charter schools having grown by more than 50% since 2001. Previous research on online learning has traditionally focused on college-level and adult learners since those have traditionally been the participants in online classes (Volle, 2005); however, as the cyber charter movement grows on a national scale and presents cyber classrooms as a viable educational alternative for the K–12 population, a new and rising sense of urgency demands more research regarding the instructional potential of cyber schooling.

Since cyber schooling is a stand-alone educational platform, students must take all of their courses online,

including foreign language (L2) classes. In L2 online classroom environments, asynchronous discussions have been reported to be one of the most common cyber forums through which learners engage in multiple interactive collaborations and audio-visual scaffolding activities to acquire an L2 (Abrams, 2003). Asynchronous discussions may be associated with general learning gains both in L2 production and self-expression as compared to face-to-face interactions, since such forums are not subject to time and autonomy limitations or disruptions embedded in traditional classrooms; asynchronous discussions allow students the opportunity to process the linguistic input at their own pace, negotiate meaning with their peers, and re-formulate responses (Hurd, 2006; Poza, 2005). Participation in asynchronous discussions has also been linked to increased motivation and reduced anxiety—a lowered affective filter, which results in greater gains in L2 acquisition (Arnold, 2007; Beauvois, 1992; Kelm, 1992).

Such asynchronous communication tools also provide students with scaffolding and multiple sources of interaction with peers and instructors in order to practice and improve an L2. L2 educators have particularly capitalized on the use of glosses and multimedia annotations in asynchronous exchanges to enhance lexical development (Bowles, 2004; Yanguas, 2009), which plays a principal role in overall L2 development (McLaughlin, 1980; Segler, Pain, & Sorace, 2002). However, although several studies have sought to address whether participation in asynchronous discussions results in improved quality of L2 production (Beauvois, 1998; Salaberry, 2001), questions remain concerning the possible relationships among anonymity or disclosure of identity, L2 motivation, participation in discussion, quality of L2 production, and success in L2 vocabulary learning. If online forums indeed offer unique participatory roles and technological and other affordances (Abrams, 2001; van Lier, 2002), exploring the nature and degree of L2 learners' motivation and level of participation—as these factors may relate to L2 attainment—is warranted.

This quantitative study attempts to redress this gap in research by exploring possible relationships between L2 production, anonymity, motivation, participation in asynchronous discussions, and the acquisition of targeted Spanish vocabulary. More specifically, it examines if (a) participation and (b) motivation contribute to L2 vocabulary learning in asynchronous discussions, and if (c) motivation is related to level of participation in anonymous versus nonanonymous asynchronous discussions. It also explores if (d) a student's quality of L2 use varies in asynchronous discussions in which they are identified by name versus being anonymous.

Second Language Acquisition (SLA) and Online Interactions

Much SLA research has presented L2 learning as an inherently complex social process that occurs when learners negotiate meaning with capable interlocutors in socioculturally meaningful interactions (Johnson, 2004; Lantolf & Pavlenko, 2000; Larsen-Freeman, 2007). However, twenty-first century language learning is becoming increasingly pluralistic as interlocutors work to negotiate meaning in the face of expanding social and cultural contexts and diversified modes of expression and interaction provided by technology. In such times of rapid change, theoretical models that incorporate multiple perspectives are particularly important (Egbert, 2005).

One such model, the ecological theory of language learning, contextualizes language into other semiotic systems in the world so that language learning is viewed as a relationship negotiated between learners and their environment (Van Lier, 2000, 2002, 2004). In ecological theory, language learners are active agents who work within their environments to engage in meaning-making activities with others more or less linguistically competent by seeking out symbolic affordances. *Affordances*, defined as relationships of possibility that potentially arise from topics or subjects of collaborative activity, can effectively replace the traditional notion of language input as an analytical tool in online language learning environments, where effective forums can support meaningful and interactive collaborations among diverse learners without imposing geographic sanctions (Satar & Ozdener, 2008).

Considering the increased popularity and the many advantages of engaging in online language learning

environments, the question remains as to whether the gains in L2 attainment seen in face-to-face interactions (Ellis, Tanaka, & Yamazaki, 1994; Gass & Selinker, 2001; Long, 1996; Mackey, 1999; Pica, 1994) can be equally documented in online interactions (Salaberry, 2001). In online L2 classrooms, synchronous discussions as well as asynchronous discussion formats, such as dialogue journals and electronic discussion boards and conferences, have been the most traditional methods that give access to peer-to-peer and teacher-student interactions in an L2 (Aitsiselmi, 1999; Barson, Frommer, & Schwartz, 1993; Beauvois, 1998).

Some contributions of asynchronous discussions to L2 acquisition have been documented in previous research. A few studies have suggested that such discussions are more student-centered by shifting the authority from teacher to students (Cooper & Selfe, 1990) and increasing student control of content, leading to more student autonomy (Tella, 1992). In addition, while some researchers have explored the benefits of such forums regarding L2 learners' control over their time, participation, and progress (Arnold, 2007), others have underscored the use and practice opportunities that asynchronous discussion offer to L2 learners (Fitze, 2006). For example, Absalom and Rizzi (2008) argue that in asynchronous discussions, learners can compose and revise responses with the assistance and collaboration of other resources and peers, producing higher quality linguistic output.

In addressing the quality and quantity of L2 production, some studies have compared online discussions with paper-pencil exchanges while others have evaluated synchronous versus asynchronous discussions. In comparing paper-pencil exchanges with e-mail dialog journals regarding L2 production, Wang (1994) found that English as a Second Language (ESL) students in the e-mail dialog journals produced more writing per session, used more language functions, and adopted a more conversational tone than their paper-pencil counterparts. Likewise, González-Bueno (1998) found that Spanish learners who used electronic dialog journals produced more quantity of output (number of words per journal entry) with higher grammatical accuracy than their paper-pencil peers. Nevertheless, while Van Handle & Corl (1998) also found in their study with intermediate German students that online exchanges may yield more language production, these exchanges did not increase the quality of linguistic production.

In addition, other studies have explored the quantity and quality of L2 production in synchronous and asynchronous discussion forums (Perez, 2003). For example, Abrams (2003) compared the production of written asynchronous, written synchronous, and control groups and found no significant differences among the groups in the quality of output in the terms of lexical richness, diversity, and syntactic complexity. Beauvois (1998) used synchronous rather than asynchronous student-to-student French discussions to examine the quantity of student-to-student communication within the discussion forum and the quality of target language use through an analysis of sentence structure. Beauvois (1998) defined two qualities of target language: formal quality, including compound/complex sentences, and content quality, including phrases going beyond a superficial treatment of the topic and referencing personal experiences. She discovered that participants in the synchronous, local-area-network (LAN) discourse generated more personal messages of multiple complex/compound sentence structures in comparison to their face-to-face peers, suggesting that electronic discussions can enhance the quality of L2 learning by bridging the gap between oral and written communication.

Online Vocabulary Learning

Previous research confirms that lexical development plays a principal role in different aspects of L2 acquisition (Bresnan, 1982; Cook, 1996; DeBot, Paribakht, & Bingham Wesche, 1997; Gadzar, Klein, Pullum, & Sag, 1985; Levelt, 1989; McLaughlin, 1980; Nation, 2001; Salaberry, 2001; Segler et al., 2002). Therefore, most current studies on L2 vocabulary acquisition focus on determining the most effective ways of interfacing computer-mediated resources with traditional best practices for vocabulary instruction (Fuente, 2003). Some of this research has studied glosses and multimedia annotations, suggesting a positive effect on the comprehension of written texts and incidental vocabulary acquisition

(Bowles, 2004; Lomicka, 1998; Yanguas, 2009). Other studies have examined a variety of computerized glossing formats and their effect on L2 vocabulary learning, reporting that the most effective glossing format is a combination of graphic representations and written annotations of target vocabulary words (Gettys, Imhof, & Kautz, 2001; Jones, 2004; Kim & Gillman, 2008), possibly because in such formats learning is integrated with immediate access to annotated information and enhanced with multi-sensory linguistic contexts (Al-Seghayer, 2001; Horst, Cobb, & Nicolae, 2005; Sun & Dong, 2004).

Most of the research cited here has focused on vocabulary acquisition through learner interaction with commercial materials or software rather than on the active engagement of students in online discussion forums with peers. This study focuses on this intersection because despite the fact that some previous research has suggested that modified student interactions enhance L2 development (Gass & Varonis, 1994; Long, 1996), current research addressing the effect of participation in asynchronous discussions on L2 lexical development is markedly limited. Indeed, due to the nature of its technological affordances (van Lier, 2002), asynchronous discussions may maximize interaction opportunities (Abrams, 2001) for L2 learners to produce more language of richer lexical quality than face-to-face conversations (Beauvois, 1997).

Motivation and Participation in Asynchronous Discussions

Some research has documented differences between online and face-to-face interactional patterns (Blake, 2000; Smith, 2003). This suggests that online discussions elicit more participation while providing better communication functions and a more comfortable environment with less communication apprehension, in turn promoting the production of higher quality and complex language (Arnold, 2007; Beauvois, 1992; Chun, 1994; Kelm, 1992; Kern, 1995; Smith, 2003). For example, in a recent study, Simpson (2006) documented that L2 learners participated in asynchronous discussions more than native-speakers due to reasons related to more autonomy, convenience, and absence of distractions that are common in face-to-face classes. Relatedly, several other studies have reported that L2 learners participate in online discussions more than face-to-face ones because they provide more comfortable and equal opportunities to diverse groups who are typically made invisible in classroom discussions (Baron, 1984; Kern, 1993; Pratt & Sullivan, 1994; Warschauer, Turbee, & Roberts, 1996).

Previous research also has underscored the role of motivation in online learning because distance learners are responsible for directing their own pace and interaction with peers and instructional materials, independent of teacher guidance. For example, results of Hurd's (2006) study on 500 French students in the United Kingdom suggested that motivation might be the most important factor in distance language learning. Skinner and Austin (1999) also reported that learners showed an increased use of L2 through computer conferencing because of the enhancement of personal confidence and motivational factors. Furthermore, previous research has associated online learning environments, in which participants' identities are anonymous, with a decrease in anxiety (Poza, 2005) and an increase in motivation to participate. Online discussions may protect English Language Learners (ELLs) from intimidation (Roed, 2003), lower the affective filter (Beauvois, 1997), and foster a level of comfort that may enhance L2 production because in such anonymous environments, the computer serves "as a shield from being on stage" (Bradley & Lomicka, 2000, p. 362) for L2 learners. This may partially be due to the reduction of paralinguistic cues such as frowning, hesitating, and raised eyebrows that serve to intimidate people and tout a power dynamic (Arnold, 2007; Warschauer et al., 1996).

While previous research has deemed online learning as a shield to protect learners from the negative aspects of traditional classrooms, some online forums, like asynchronous discussions, may take non-anonymous forms of interaction. As such, we could expect that online learners may experience a reaction as their identities are unveiled and their disclosures and contributions are directly linked to them as individuals. We seek to explore these potential effects of anonymity on participation in asynchronous discussion as it intersects with L2 vocabulary acquisition. Among other motivation theories, Deci and

Ryan's (1985, 1987) self-determination theory, particularly the extrinsic forms, are well-suited to the goals of this study because our participants are learning Spanish as a foreign language in the United States, where acculturation or assimilative elements of motivation may not be very strong. In addition, this model has been validated, calibrated, and widely applied to various SLA contexts (Grolnick & Ryan, 1989; Ryan & Connell, 1989). Therefore, adopting a multidimensional view of extrinsic motivation is more comprehensive because such orientations vary from *external regulation* (doing a task due to externally imposed rewards or punishments) to *introjection* (engaging in a task due to the attainment of self-esteem or ego enhancement, or avoidance of guilt or anxiety) and to *identification* (identifying with the personal importance of the task) and *integration* (doing a task because it emanates from the self).

METHODOLOGY

Participants and Setting

Students from two Spanish II courses which met five times weekly self-selected to participate in this experimental study by responding to a call for participation. This call was sent out during two consecutive semesters. From a possible pool of 122 students, 115 students (age range: 14–17) expressed willingness to participate in this study; however, data from 28 students were not included in this study due to reasons related to incomplete pre- and post-tests and questionnaires and/or lack of full participation in all experimental activities. Therefore, participants included 87 students (response rate = 76%) (49 girls, 38 boys) who were enrolled in high school Spanish II courses at a tuition-free public cyber charter school in an Eastern U.S. state. The overwhelming majority of participants self-identified as white non-Hispanic (84%), followed by black non-Hispanic (11%), Hispanic (3%), and other (2%). The setting and courses were selected because of accessibility.

All participants were native speakers of English and had at least one year of previous experience with cyber learning including extensive Moodle training. Analysis of school records suggested that participants had either successfully completed a Spanish I course at this or another high school or were placed into this level based on their performance on a placement test. Participants' overall Spanish proficiency levels were determined as low-intermediate. All participants in the study used the same syllabus, were taught by the same teacher (the second author), and were familiar with the online textbook components of the commercial text, *Exprésate 2* (McMinn, 2008).

The students, who receive their education exclusively through the Internet, are all distance learners pooled from across this eastern state. As such, all students receive a complete desktop computer system, including a printer, a scanner, a copier, and a microphone headset that they use to connect to the Internet. Students log into the school website daily to access their courses. Courses are taught by highly qualified, state-certified teachers, who personally deliver curriculum used in the course via the Moodle course management system. Students receive both commercial textbooks and online materials to support their instruction. They interact daily with their teachers through telephone, email, and instant messaging and receive personalized feedback and support for all schoolwork.

Research Questions

1. What is the relationship between participation in asynchronous discussions and success in L2 vocabulary learning?
2. How does motivation relate to level of participation in anonymous versus nonanonymous asynchronous discussions?
3. What is the relationship between motivation and success in L2 vocabulary learning in asynchronous discussions?
4. Does quality of L2 language use differ in anonymous versus nonanonymous asynchronous discussions?

The Lesson and Experiment Procedures

Prior to the implementation of the experiment, all 87 participants were given a background and motivation questionnaire and completed the three following procedures that involved their typical online Spanish learning instruction. First, following the school's regular curriculum sequence, 24 target words were selected from the students' textbook to be taught in the lesson. Second, all participants were exposed to the 24 targeted words using Moodle's online course module through several warm-up, reading comprehension, and vocabulary learning activities. This typical online Spanish learning instruction involved the use of open-source software available through Moodle, a tool that provides lesson modules that can be tailored to meet the individual needs of students (Brandle, 2005). The lesson comprised of *Pre*, *During*, and *Post* reading parts. The *Pre* activities involved building background knowledge through reading texts accompanied by audio prompts and examination of titles and illustrations, brainstorming pertinent vocabulary, completing illustrated vocabulary guides with sentence-level translations (Jones, 2004; Kim & Gilman, 2008) and highlighting the target words in the text (*El ratón del pueblo y el ratón de la ciudad*). The *During* activities involved (re-) reading the text, which was accompanied by a prerecorded audio file, summarizing content, identifying the main idea, and verifying their responses through a self-check clickable link. The *Post* activities that encompassed the practice and application portion of the lesson were twofold. To facilitate learning via L1 support (Jimenez, 2003; Lucas & Katz, 1994), students also answered some reading questions in English before they completed several comprehension questions in a Spanish quiz. To ensure participation in the lesson, students' records were retrieved from Moodle. Third, students were given a vocabulary recognition test and a cloze (pre/post-test) that involved the meaningful use of the selected words in context (Hughes, 2003). Both the cloze and the recognition tests were timed to minimize possible use of online resources such as translators or dictionaries. An average score was computed for each student's performance on these two tests as their pre-test scores. Out of the 24 words, students' correct responses ranged between 8 and 19 (mean = 13.9).

Upon the completion of these instructional steps, the students were randomly assigned to experimental ($n = 46$) and control groups ($n = 41$). Both of these groups continued to follow their regular Spanish II curricula. While the control group did not receive further structured activities that targeted the 24 specific vocabulary words, two weeks later, the participants in the experimental group joined in two asynchronous discussions—neither being strictly structured—responding to certain instructor-led prompts that involved the use of the targeted words in a Moodle forum. During each discussion, students were asked to use as many target words as they could while discussing the prompts with their classmates. The prompts included “Tell your classmates what your city or town is like; I think living in a town/city is better than living in a town/city because...; I enjoy traveling very much because...; and I don't like traveling very much because...” They were asked to post as many threads as they wanted throughout the week, either directly responding to the prompts or to their classmates' comments; however, a minimum of at least three posts was mandated to establish a baseline. To respond to potential time constraints in students' schedules, each discussion was made available for two weeks. To control for possible confounding effects (e.g., teacher's moderation skills) on students' participation, and language use and learning, the teacher's involvement was limited to only setting up the discussion forums and providing the participation guidelines. To avoid the use of known nicknames as pseudonyms and inaccurate gender-identification and thereby ensure full anonymity, participants were randomly assigned pseudonyms by the researchers. At the end of the discussions, each student's posts were saved in separate folders.

Finally, all participants were given a post-test to determine if any significant differences between the experimental and control groups occurred as a result of participation in the anonymous versus non-anonymous discussions. The post-test was administered three weeks after the completion of the discussions to minimize short-term recall possibilities.

Data Collection and Instrumentation

Data sources included questionnaires, vocabulary tests, and e-documents retrieved from the asynchronous discussions. Each participant spent around 125 minutes providing the data, including a pre/post-test that was comprised of a vocabulary recognition test (35 minutes), a cloze test (65 minutes), background and motivation questionnaires (25 minutes), as well as the discussions (experimental group). The background questionnaire included information about participants' gender, grade level, age, and years in cyber schooling as well as comfort level with technology use, degree of Spanish use outside the class and at home (on a 5-point Likert scale), and reasons for learning Spanish. The motivation questionnaire, which is based on Deci and Ryan's (1985, 1987) self-determination theory, had five sections asking about why they did their Spanish homework, why they worked on their Spanish class work, why they tried to answer hard questions in their Spanish classes, why they were learning Spanish, and why they should be concerned about attaining the highest proficiency level possible. Using an e-survey format within Moodle, participants reported their responses on a 7-point Likert-scale, with 1 = "Not at all true" and 7 = "Very true." They reported the degree to which the items in each section measured external, introjected, identified, and integrated regulation. A mean score was calculated for each of the four self-determined orientations. To determine the reliability of this questionnaire—the internal consistency of the survey items and their answers—we calculated Cronbach's alpha (1951). The questionnaire yielded higher alpha levels ($\alpha = .86$) than what is considered minimum ($\alpha = .70$) for scales used in educational research (Nunnally & Bernstein, 1994; Stemler, 2004).

The recognition tests asked the participants to match synonyms, antonyms, and related words in the two columns while the cloze test measured students' knowledge of eight nouns (e.g., blocks, countryside), eight verbs (e.g., turn, hug), and eight adjectives (e.g., narrow, simple) in Spanish. By using these two instruments, we aimed to capture a more accurate estimation of students' knowledge of the target words. Since these words were taught in a meaningful unit (Towns and Cities) of the course textbook (Holt et al., 2008), they shared some inherent lexical value that made it easy for participants to use them in meaningful contexts in the asynchronous discussions.

Data Analysis

A series of repeated-measure analysis of variance (ANOVA), multiple regression, and paired *t*-tests, were performed, comparing and contrasting scores of participants both within (repeated measure) and across the experimental and control groups (Warner, 2008). An experiment-wise α level of .05 was set for all statistical calculations. While the first research question involves a series of comparisons both within the experimental group and between the experimental and the control group, the other analyses only include variance in the scores of the experimental group participants in anonymous versus nonanonymous asynchronous discussion forums. To examine success in L2 vocabulary learning after participation in the two asynchronous discussion forums, a one-way repeated measure ANOVA with one within and one between factors was performed. To address students' motivation as it relates to success in L2 vocabulary learning and participation in anonymous versus nonanonymous asynchronous discussions, multiple regression analyses were run. In these models, the motivation variables were used as predictors of the level of participation and success in attaining the targeted vocabulary. To determine differences in the quality of language use in the anonymous versus nonanonymous forums, several paired *t*-tests were performed using the number of correct simple and complex sentences, and capitalization, punctuation, and grammar mistakes. Among two possible analytic techniques appropriate for these data, we chose *t*-test analyses with Bonferroni adjustments (to control for possible problems related to multiple comparisons) instead of MANOVA to adhere to APA guidelines that suggest the use of the simplest analysis method available for a set of data (APA Manual, 2010; Warner, 2008). These language quality categories had been identified based on previous studies, in particular, Abrams (2003) and Beauvois (1998). Data were also dummy-coded to look for possible gender effects; however, the sample size would not allow such analyses.

RESULTS

Question 1. What is the relationship between participation in asynchronous discussions and success in L2 vocabulary learning?

Results revealed that the pretest scores of participants in the experimental ($M = 14.02$, $SD = 3.87$) and control groups ($M = 13.85$, $SD = 3.55$) were not significantly different from each other ($F(1, 86) = .408$, $p = .948$), which is to be expected. Hence, to determine the effect of participation in asynchronous discussions on vocabulary learning, a one-way repeated measure ANOVA with one within and one between factor was performed. In this model, pre- and post-test scores were entered as the within-subject variables and the group assignments (experimental/control) as the between-subjects factor. Results suggested a significant difference between the post-test scores of the experimental and control groups ($F(1, 86) = 7.97$, $p < .01$, partial $\eta^2 = .08$), indicating that students who participated in the asynchronous discussions obtained higher scores ($M = 18.46$, $SD = 3.32$) than those who did not ($M = 12.93$, $SD = 3.91$).

Question 2. How does motivation relate to level of participation in anonymous versus nonanonymous asynchronous discussions?

The number of threads a participant posted in each discussion forum was used as basis to determine his or her level of participation. Note that a minimum of three posts was required to establish the baseline; however, participants were encouraged to post as many threads as they liked. Analyses revealed that, in response to the discussion prompts, the number of threads the participants posted in the nonanonymous forum ($M = 4.70$, $SD = 1.70$) was significantly higher than those they produced in the anonymous one ($M = 3.98$, $SD = 1.20$, $t(45) = 3.92$, $p < .001$). Thus, in a multiple regression model, we inserted motivation (external, introjected, identified, and integrated regulation) scores as predictors of level of participation in anonymous discussion, obtaining an R^2 of .22 ($p < .01$). Table 1 shows that of the four motivation variables, only identified regulation was a significant predictor of level of participation in the anonymous asynchronous discussion (.39).

Table 1. Standardized beta coefficients from two regression models predicting level of participation from four motivation variables in anonymous versus nonanonymous asynchronous discussion forum

Predictors: Level of participation	Beta	R^2	R^2 adjusted
Model 1—Anonymous forum		.22*	.15*
External regulation	.24		
Introjected regulation	.23		
Identified regulation	.39**		
Integrated regulation	.03		
Model 2—Nonanonymous forum		.32**	.25**
External regulation	.12		
Introjected regulation	.33*		
Identified regulation	.42**		
Integrated regulation	.17		

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

Next, we constructed another multiple regression model for the nonanonymous forum, for which we found an R^2 of .32 ($p < .01$). Taken together these results suggest that these variables together account for some of the variance in participants' level of participation in the two discussion forums. Table 1 demonstrates that two of the four motivational orientations were low but significant predictors of level of participation in the nonanonymous asynchronous discussion: introjected (.33) and identified regulations (.42). They also indicate that as the level of identified regulation increased, the level of participation also

increased regardless of the kind of discussion forum, while the introjected orientation was correlated with level of participation only for the nonanonymous forum.

Question 3. What is the relationship between motivation and success in L2 vocabulary learning in asynchronous discussions?

Having found that students with higher levels of some forms of motivation (introjected and identified forms) participated in the discussions more, we then needed to examine if these motivation forms predicted higher gains on the vocabulary post-test. Hence, we constructed a multiple regression model with the four motivation forms acting as predictors of success in L2 vocabulary attainment ($R^2 = .34$, $p < .01$). Data suggested that of the four motivation orientations, introjected regulation was the only significant predictor of success in learning the 24 selected words (.37). This result implies that avoidance of guilt or anxiety or the attainment of self-esteem or ego enhancement were among the forces that moved these students to acquire more Spanish vocabulary (Table 2).

Table 2. Standardized beta coefficients from a regression model predicting gains on the vocabulary test from four motivation variables in asynchronous discussion forums

Predictors: Gains on Vocabulary Test	Beta	R^2	R^2 adjusted
Model 3—Anonymous Forum		.34**	.27**
External Regulation	-.22		
Introjected Regulation	-.04		
Identified Regulation	.25		
Integrated Regulation	.37**		

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

In addition, multivariate regression analyses yielded no statistically significant relationships between the post-test scores and level of participation (number of posts) either in the anonymous or the nonanonymous forum.

Question 4. Does quality of L2 language use differ in anonymous versus nonanonymous asynchronous discussions?

The categories used to measure the quality of L2 use were borrowed from Abrams (2003) and Beauvois (1998). To examine if the quality of L2 use the participants produced in nonanonymous discussion significantly differed from the anonymous one, we performed five dependent t -tests on the experimental group data. In these tests, we compared the quality of L2 production in the two discussion forums on the basis of five variables (correct simple and complex sentences; capitalization, punctuation, and grammar mistakes). Namely, we counted the numbers of correct simple and complex sentences as well as the capitalization, punctuation, and grammar mistakes in the discussion forums. Thus, we used the Bonferroni adjustment to avoid the probability of obtaining spurious significance as a result of multiple comparisons (Type 1 error). Thus, we divided the experiment-wise .05 significance level by the number of tests we performed (5), establishing a significance level of .01 for each t -test.

Descriptive statistics (see Table 3) show that participants produced more correct simple and complex sentence structures in the nonanonymous forum than in the anonymous one. In contrast, the numbers of capitalization, punctuation, and grammar mistakes they produced were higher in the anonymous forum than in the nonanonymous one.

Next, we ran t -tests to determine if these mean differences were indeed statistically significant. Results revealed that participants' scores between the anonymous and nonanonymous forums varied significantly

on four of the five comparisons. Results indicate that in the nonanonymous discussion participants produced more correct simple sentences ($t(45) = 3.82, p < .001$) than the anonymous one; however, the number of correct complex sentences did not vary significantly by the kind of discussion forum. Table 3 also demonstrates that participants made fewer capitalization ($t(45) = 2.69, p < .01$), punctuation ($t(45) = 3.09, p < .01$), and grammar mistakes ($t(45) = 2.61, p < .01$) in the nonanonymous discussion

Table 3. Descriptive statistics for the quality of language variables in anonymous versus nonanonymous discussion forums ($n = 46$)

Language Quality Measures	<i>M</i>	<i>SD</i>
correct simple sentences—nonanonymous forum	9.80	4.66
—anonymous forum	8.65	4.14
correct complex sentences—nonanonymous forum	3.76	2.08
—anonymous forum	3.56	1.82
capitalization mistakes—nonanonymous forum	4.50	3.48
—anonymous forum	5.63	4.39
punctuation mistakes—nonanonymous forum	6.06	3.97
—anonymous forum	6.95	4.66
grammar mistakes—nonanonymous forum	9.21	5.41
—anonymous forum	10.15	5.28

forum than the anonymous one, suggesting that they produced higher quality of language when their identities were revealed to each other. (See the Appendix for examples of student posts in anonymous and nonanonymous forums.)

DISCUSSION

Findings from the first question reveal that students who participated in the asynchronous discussions received significantly higher scores on the post-test than those who did not. In response to the discussion prompts, the participants posted more threads in the nonanonymous forum than the anonymous one. In addition, results indicated that as the level of identified regulation increased, the level of participation is predicted to increase regardless of the kind of discussion forum. However, introjected orientation was correlated with level of participation only for the nonanonymous forum. Indeed, data suggested that introjected regulation was also a significant predictor of success in learning vocabulary in asynchronous discussions. Note that the significance levels of these correlations ranged from low to moderate. Finally, data revealed that, compared to the anonymous forum, participants produced higher quality of language in the forum where their identities were revealed to each other, producing more correct simple sentences and fewer capitalization, punctuation, and grammar mistakes.

Although previous research has documented the role of vocabulary in L2 development (Bresnan, 1982; Cook, 1996; DeBot et al., 1997; Gadzar et al., 1985; Levelt, 1989; McLaughlin, 1980; Nation, 2001; Salaberry, 2001; Segler et al., 2002), research on the interaction of individual and contextual variables in L2 vocabulary attainment in cyber ecologies is rather limited. Furthermore, it is important to examine the role of anonymity, participation, and motivation in L2 vocabulary learning in cyber contexts because, unlike in brick-and-mortar classrooms, students who receive education in such environments do not engage in face-to-face-like interactions. In other words, due to the particularity of online ecological affordances (Abrams, 2001; van Lier, 2002), the indexicality norms of self and identity may take different forms, positions, and interaction patterns. It is, then, plausible that learners engage in different linguistic (Milroy & Gordon, 2003) and L2 learning behavior (Lantolf & Thorne, 2006). In light of research on social networks in L2 attainment, it is possible to assume that there will be differences in ways students in

these environments rely on emotional and material support from each other because the nature, frequency, and closeness of their interactions are different (Milroy, 1992; Polat, 2011). Hence, one might assume that students in such ecologies may not be concerned about the quality of language they produce when their identities are revealed or vice versa, and some extrinsic motivational forms that originate from fear of negative evaluations by peers, avoidance of guilt, anxiety, ego enhancement, or self-esteem may need special attention.

Participation and L2 Vocabulary Learning

Our data revealed that students who participated in the asynchronous discussions (experimental group) obtained significantly higher scores on the Spanish vocabulary test than those who did not (control). The .08 effect size (partial η^2), the practical significance of this result, is considered medium in educational research (Cohen, 1988). This finding is in line with previous research on the contributions of asynchronous discussions to L2 learning. In light of previous research, we can argue that such cyber ecologies are imbued with affordances related to increased student autonomy (Cooper & Selfe, 1990) and control over the content (Tella, 1992), thereby leading to high learning gains. One could further speculate on learner autonomy-related affordances because the online discussion forums have been found to benefit L2 learning by giving learners control over their time, participation, practice, and progress (Arnold, 2007; Fitze, 2006). Other advantages of asynchronous discussion forums may be related to technological affordances, including glosses and multimedia annotations (Bowles, 2004; Lomicka, 1998; Yanguas, 2009), graphic representations (Gettys, Imhof, & Kautz, 2001; Jones, 2004; Kim & Gillman, 2008), and integrated immediate access to enhanced multi-sensory linguistic contexts (Al-Seghayer, 2001; Horst, Cobb, & Nicolae, 2005; Sun & Dong, 2004). However, since the control group did not receive a further structured set of alternative tasks that involved the use of the targeted words in an off-line format, only practicing the targeted vocabulary words in the course of their regular class activities, the significant difference obtained here could be due to the amount of further practice rather than this particular discussion format. Overall, though, results do indicate that asynchronous forums are an effective format to develop L2 vocabulary.

Motivation, Participation, Anonymity in L2 Learning

We used the number of posts in each forum to determine a participant's level of participation. Our results indicated that, in responding to the discussion prompts, participants produced significantly higher ($p < .001$) numbers of posts in the nonanonymous forum than they did in the anonymous one. In fact, a simple calculation also revealed a higher number of word-count in the nonanonymous forum. Thus, in terms of student participation in learning tasks and the lowering of the affective filter (Beauvois, 1997; Krashen, 1985), we can argue that nonanonymous forums may have a comparative advantage over the anonymous ones. This is an interesting finding because, on the one hand, students may be expected to participate in anonymous forums more than the nonanonymous ones because such ecologies have been found to be less threatening or anxiety-provoking (Poza, 2005) or protect the learners from possible verbal attacks or intimidation (Roed, 2003), with anonymity acting "as a shield from being on stage" (Bradley & Lomicka, 2000, p. 362). We could also argue for the benefits of anonymous forums to increase the amount of student participation due to possible reasons related to learner styles, personality, and so forth (Kern, 1995; Waschauer et al., 1996).

On the other hand, as evidenced by our data, learners may participate in nonanonymous forums more than anonymous ones due to certain motivational forms that we have examined in this study. In fact, the regression model we constructed based on self-determination theory accounted for some variance in participants' levels of motivation in both forums (anonymous: $R^2 = .22$, $p < .01$; nonanonymous: $R^2 = .31$, $p < .01$). More interestingly, however, is that one of these four extrinsic forms of motivation seemed to be a significant predictor of level of participation in both of these forums, whereas students' level of participation increased as their level of introjected orientation also increased only in the nonanonymous

forum. These results may imply that for students who identify strongly with the importance of learning an L2 (identified regulation), whether a discussion forum is anonymous or nonanonymous may not matter. Nonetheless, for students who are more concerned about issues of ego enhancement, avoidance of guilt or anxiety, or the attainment of self-esteem, nonanonymous forums may provide higher levels of participation (Arnold, 2007). Relatedly, analyses corresponding to our third research question revealed that the higher the level of some forms of motivation (introjected and identified forms), the more frequently the students participated in the discussions. Thus, we needed to determine if, indeed, these motivation forms and different levels of participation predicted higher gains on the vocabulary post-test. Interestingly, once again, introjected orientation was the only significant predictor of high gains in L2 vocabulary learning.

Another vital question at this point is whether high levels of participation in anonymous versus nonanonymous forums were related to success in L2 vocabulary attainment. Despite the fact that the participants posted more threads in the nonanonymous forum, level of participation (number of posts) did not seem to be related to success in L2 vocabulary learning, neither in the anonymous nor in the nonanonymous forum. Based on SLA research, one could speculate a possible significant relationship had the sample size been bigger, at least between the level of participation in nonanonymous forums and gains in L2 vocabulary. Note that this study does not examine the complex processes of social interactions of L2 learners in online discussions of different nature; however, our findings suggest that such environments seem to offer facilitating interactions and learning opportunities that may present ecological affordances of different nature depending on an anonymity effect. Thus, in light of L2 attainment theories, particularly input and interaction hypotheses, and ecological theory (Ellis, Tanaka, & Yamazaki, 1994; Gass & Selinker, 2001; Krashen, 1985; Long, 1996; Mackey, 1999; Pica, 1994, van Lier, 2002), these results underscore the potential of cyber ecological affordances not only in terms of higher exposure opportunities to comprehensible input but also higher learning gains.

In sum, while our results corroborate the findings of some previous research that participation may be linked to increased motivation in online asynchronous discussions due to its interactions with anxiety, autonomy, peer scrutiny and intimidation, and so forth (Arnold, 2007; Beauvois, 1992; Hurd, 2006; Poza, 2005; Kelm, 1992), we argue that anonymity is also somewhat linked to different forms of motivation and students' level of participation in L2 learning tasks. Finally, in terms of motivation theory, these results are also interesting, because according to Deci and Ryan (1987), introjected orientation is a less autonomous form of self-determined motivation and has been frequently found to be negatively correlated with L2 attainment. In other words, the amount of time learners would invest in tasks would depend on their perceptions about their control over the tasks. Interestingly, learners in this study seemed to perceive higher levels of autonomy in the nonanonymous forum than they do in the anonymous one, and their introjected motivation seemed to be positively related to success in L2 learning.

Anonymity and Quality of L2 Use

The possibility that the quality of L2 use may vary in different asynchronous forums also deserves exploration because anonymous and nonanonymous discussions offer potentially different ecological affordances. One could then speculate that learner variables such as anxiety, motivation, perceptions about self and identity, agency, socialization patterns, and so forth (Polat, 2011; Polat & Mahalingappa, 2010; Block, 2007; Cziser & Dörnyei, 2005; Dörnyei & Ushioda, 2010; Milroy & Gordon, 2003; Lantolf & Thorne, 2006) may interact differently in anonymous versus nonanonymous forums, thereby generating L2 production of different qualities. Thus, in examining whether the quality of L2 use the participants produced in the nonanonymous discussion significantly differed from the anonymous one, we compared the number of correct simple and complex sentences, and capitalization, punctuation, and grammar mistakes each participant produced in each forum. We do, however, acknowledge that quality of language entails more than what we have examined in this study. Despite the conservative nature of the Bonferroni adjustment, results suggested that the participants did, indeed, produce significantly higher numbers of

correct simple sentences and fewer capitalization, punctuation, and grammar mistakes in the nonanonymous forum than the anonymous one.

It seems rather obvious that differences in the nature of ecological affordances may have an impact on the quality of L2 use in these forums. Indeed, participants had access to the same resources (González-Bueno, 1998) and/or counter-tasks (Lantolf & Thorne, 2006, p. 238) in both of these forums, and it is hard to speculate as to why these differences might have occurred other than the nature of the environment. Finally, unfortunately it is hard to interpret our findings in light of previous research because most of these studies either compared online discussions to paper-pencil exchanges (Beauvois, 1998; González-Bueno, 1998; Cooper & Selfe, 1990; Van Handle & Corl, 1998; Wang, 1994) or examined differences between synchronous and asynchronous discussions regarding different language skills (Abrams, 2003; Perez, 2003).

CONCLUSION AND IMPLICATIONS

Similar to several previous studies, this study also demonstrates that (a) asynchronous discussion forums are effective in producing learning outcomes in L2 attainment, (b) in terms of level of participation, nonanonymous asynchronous forums may have a comparative advantage over anonymous ones for learners with high levels of introjected regulation whereas for learners with high levels of identified regulation both forums are advantageous, (c) of the four self-determined motivational forms, introjected regulation was the only significant predictor of success in learning L2 vocabulary in asynchronous discussions, and (d) regarding offering ecological opportunities, nonanonymous forums seem to generate higher quality of L2 production than anonymous ones.

We believe these findings have several implications for L2 learning and teaching in cyber settings. Our findings confirm the vitality of the growing cyber movements in K-12 education, particularly the effectiveness of L2 learning opportunities that the cyber ecologies have to offer. Thus, the over 50% growth in the number of cyber charter schools in the last decade in the United States is not surprising, and the trend is likely to continue. Nonetheless, our findings come with a caveat: the effectiveness of asynchronous discussion forums may be mitigated by the kind of motivation L2 learners have. Thus, educators involved in cyber schooling need to conduct needs analysis and identify L2 learners' affective, cognitive, and metacognitive differences before deciding on whether to adopt anonymous versus nonanonymous forums.

Current research on some affective and metacognitive factors, extrinsic pressures, autonomy, anxiety, and control over positioning one's self seems to beg for special attention to maximize the effectiveness of online L2 learning forums. Hence, future research that employs a multivariate exploration of the interaction of these variables is much needed. Indeed, future research also needs to examine more closely the nature of ecological affordances and how learner variables vary and interact in anonymous versus nonanonymous forums because as evidenced in our findings participants may produce higher quality L2 in nonanonymous forums than they do in anonymous ones. Finally, our findings indicated that higher levels of participation in the L2 did not seem to significantly contribute to success in L2 vocabulary learning. This could possibly be due to participation in online forums not always implying active attendance on the assigned tasks (Lantolf & Thorne, 2006). It could also be that the length of participation was inadequate or the sample size in this study was not big enough to obtain statistical significance. Either way, we believe that future studies that involve participation in discussion forums of longer periods on bigger sample sizes could shed light on this finding.

APPENDIX. Sample student posts in anonymous versus nonanonymous asynchronous discussions

Participant	Non-anonymous	Anonymous
1	Mi pueblo no es muy grande. Mi ciudad es tranquila. Me gusta vivir en mi ciudad porque me puedo relajar aquí. Cuando miro afuera de la ventana a veces puedo ver venados u otros animals.	Mi pueblo es pequeño, limpio y tranquilo. Me gusta mi ciudad porque no está ocupado como el de la ciudad.
2	Me gusta viajar mucho, porque veo muchos bonitos lugares alrededor del mundo.	Me gusta viajar mucho porque me gusta sé nuevo ciudades. Me gusta conocer lugares gran.
3	Me gusta viajar mucho porque me gusta conocer nuevos lugares y conocer a gente nueva. Me gusta ver cómo vive otra gente. También me gusta ver los lugares históricos adonde viajo.	Me gusta viajar mucho, porque veo como las personas vive. Me gusta conocer a nuevos lugares y gente nueva.

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