LANGUAGE LEARNING THROUGH SOCIAL NETWORKS: PERCEPTIONS AND REALITY

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Language Learning Social Network Sites (LLSNSs) have attracted millions of users around the world. However, little is known about how people participate in these sites and what they learn from them. This study investigated learners' attitudes, usage, and progress in a major LLSNS through a survey of 4,174 as well as 20 individual case studies. The study hints at the potential of LLSNSs, given the generally positive regard participants have for the site, but it also shows its limitations, since most learners drop out or show only limited gains. The study suggests that if online education is to play a positive role in the teaching and learning of English and other languages, learners will need support, guidance, and well-structured activities to ensure the kinds of participation and linguistic interaction that can lead to success.

Language(s) Learned in Current Study: English

Keywords: Computer-assisted language learning, Distance learning, Online teaching and learning, Social networking

APA Citation: Lin, C.-H., Warschauer, M., & Blake, R. (2016). Language learning through social networks: Perceptions and reality. *Language Learning & Technology*, *20*(1), 124–147. Retrieved from http://llt.msu.edu/issues/february2016/linwarschauerblake.pdf

Received: July 24, 2014; **Accepted:** March 17, 2015; **Published:** February 1, 2016

INTRODUCTION

Language learning social network sites (LLSNSs), online communities specifically aimed at encouraging collaboration between language learners (Harrison & Thomas, 2009), bring together opportunities for students to receive structural tutorials and deploy what they learn in authentic communication with native speakers around the world. The emergence of LLSNSs thus brings together two important features of Computer Assisted Language Learning: instruction and communication.

A number of start-ups and academic institutions have launched specialized websites for language learning, including Livemocha[1], iTalki, Lang-8, Hello-Hello, Duolingo, and Palabea. Livemocha, for example, provides both language-learning materials and opportunities to practice the user's target language with more than 13 million international users. Its approach aligns with the community-of-practice theory (Wenger, 1998), according to which learning occurs when a group of people who share a particular interest interact regularly. Wenger further suggests three essential components for a community of practice: a shared domain of interest, mutual engagement within the community, and a shared repertoire of resources and practices. Users of LLSNSs have a shared domain of interest: language learning. The peer-review feature of most of these sites may promote mutual engagement, as users collectively engage in discussion to achieve their goals. The provision of feedback to other site members is also indicative of a shared repertoire of resources and practices, in the sense that a given member's knowledge of their own native language represents expertise that is valuable to other members who are seeking to learn that language.

LANGUAGE LEARNING THROUGH SOCIAL NETWORK SITES

Early research on language learning on both LLSNSs and other social-network sites (SNSs) has focused on attitudes, usage, and progress.

Attitudes

Though users may have concerns about privacy and surveillance on SNSs, according to Vie (2007), they do not fear sharing and exchanging information. Chen's (2013) study illustrates how attitudes towards Facebook affected the literacy practices of two international students, Cindy and Jane (pseudonyms), in the United States. Cindy equated being literate in English to mastering academic English, so the use of Facebook was not important to her due to its informality, nor did it appeal to her for socializing which she preferred to do in her native language. In contrast, Jane perceived Facebook to be a welcoming space for English learners and therefore used it to construct her new identity as an experienced user of English as a foreign language.

Though users generally seem to have positive, if often complex, attitudes towards using SNSs, user attitudes to LLSNSs remain unclear. Stevenson and Liu (2010) documented both positive and negative user attitudes towards three LLSNSs. On the one hand, their participants generally reported excitement about learning from native speakers. On the other hand, they were hesitant about how LLSNSs were meant to be used, with one respondent commenting that Livemocha "should be built for learning a language, not for finding others for the purpose of establishing social relationships" (p. 249). Other users also expressed concerns about the quality of the feedback that other users provided.

Usage

Regarding the use of SNSs among non-native speakers of these sites' principal languages, several studies highlight the importance of socialization. Mitchell (2012) proposes that learners of English should use Facebook to help acclimatize themselves to college life, build friendships with English native speakers, and experiment with the language. Vie (2007) also suggested that SNSs provide a space for socialization in which learners are exposed to authentic language used for diverse social purposes.

At least two studies suggest that language learners' use of SNSs decreases over time. Chen's (2013) above-mentioned participants demonstrated decreased participation on Facebook over time, as measured by the number of status updates and other postings. Stevenson and Liu (2010) reported that 54% of their participants used Babbel for less than one month, and 26% used it for only one to three months.

Progress

Prior studies of SNSs investigate three aspects of learning progress: identity construction and development, socialization and pragmatics, and language improvement.

Identity construction and development

Considerable attention has been paid to identity construction and development in the second language (L2) as an indicator of learning progress on SNSs. From her observation of two multilingual writers, Chen (2013) concluded that SNSs empower users to navigate across languages, cultures, and identities. Similarly, research by Blattner and Fiori (2011), Klimanova and Dembovskaya (2013), and Mills (2011) supports the notion that SNS use helps learners construct their L2 identity and build a relationship with the target culture.

Socialization and pragmatics

Several studies suggest that social interaction on SNSs helps students to develop pragmatic competence. Vie (2007) documented how using MySpace and Facebook improved students' rhetorical awareness. Chen's (2013) case study illustrated the potentials of using Facebook for acquiring pragmatic use in

English. Similarly, Blattner and Fiori (2009, 2011) studied learners taking an intermediate Spanish course and found that, through the use of Facebook, these students developed socio-pragmatic competence in areas such as greetings and leave-takings over the course of a semester.

Language improvement

Some studies have found association between SNS use and improvement in new literacies and language skills (e.g., Lee, 2006; Mills, 2011), and others have focused on non-standard uses of language in online interactions (e.g., Chen, 2013; Lee, 2006). Stevenson and Liu (2010) reported that users of Babbel perceived progress in vocabulary as well as increased confidence in using the target language. Mills (2011) used Facebook in a French classroom and found that this fostered an interactive community for communication, interaction, and discussions. Lee (2006) also reported that the frequency of L2 learners' participation on SNSs appeared to have a positive impact on their oral proficiency, vocabulary acquisition, and syntactic complexity. While the findings from Lee's study seemed encouraging, she also reported non-standard use of language forms among her participants, with Korean heritage language learners choosing to use non-standard orthography in Korean to express their affiliation with a particular subculture.

LLSNSs represent an attempt to take the potential of SNSs a step further, providing users with more specific instructional resources and more targeted opportunities for L2 communication. Such sites have reached tens of millions of people in recent years. But what impact have they had on learning? We investigated three broad questions to address this issue:

1. *Attitudes*: What were users' attitudes toward L2 learning on a large LLSNS?
2. *Usage*: What patterns of individual usage emerged from LLSNS participation?
3. *Progress*: How much did individual LLSNS users think they learned? What actual L2 improvement appeared to take place?

METHODS

Context

This study focused on Livemocha (see Figure 1), a major LLSNS with the highest traffic among its competitors in 2012[2] (Alexa, 2012), more than 16 million international users in 2013 (Livemocha, 2013), and a purported growing impact on language learning (Jee & Park, 2009; Liaw, 2011). After users create a personal profile on the site, they choose the language they wish to study. More than 160 hours of language-learning materials are available for free in each of 38 languages. These materials are tailored to beginner and intermediate levels and include reading, writing, listening, and speaking exercises. Once users complete a lesson, they are asked to post their speaking and writing exercises so that others can review them and provide comments. Users can also find language-exchange partners, add them as friends, and give and receive tutoring using voice- or text-based chat. There are two types of reward points granted by the site: *study points*, which users earn for completing free courses, and *tutor points*, which are earned for tutoring others, providing comments, and creating online flashcards. To encourage user interaction, users are required to obtain a certain number of tutor points to unlock all exercises in the free courses. Badges are also provided to incentivize and confirm accomplishment, with different types of badges awarded to users who complete certain tasks, such as offering comments to others.[3] In addition to free language-learning materials, Livemocha provides premium courses for a fee.[4]

Data collection

Data for the study included a survey of 4,174 Livemocha users as well as interviews and document analysis from 20 case-study participants.

Survey

The researchers developed a 23-item survey, for which the target participants were 18 years old or above. It was made available on Livemocha in English, Chinese, Spanish, and Portuguese—languages spoken by 84% of the participants on the site—from April to June 2009 and required approximately 20 minutes to complete.

Figure 1. Livemocha home page (legacy version as of 2011)

Before conducting the study, we asked Livemocha representatives if they could help us post our survey on their site, and they agreed to do so. During the survey period, people who accessed the site and who spoke any of the four survey languages were randomly exposed to a banner advertisement near the top of the page inviting them to take the survey in the language they spoke. A target of at least 1,000 responses was set for each language-version of the survey. For the Chinese, English, and Spanish versions this goal was surpassed in three months. The Portuguese survey was made available for an additional four months, but still did not meet the target; it was removed when no additional responses were received over a final two-week period (See Table 1).

Case study

In order to provide a focused look at one segment of Livemocha users, a group of case-study participants who had a particular language background (Chinese) and who were studying a particular foreign language (English) were recruited from among the survey participants. These languages were chosen due to their prominence: English is the most widely studied foreign language around the world, and Chinese speakers represent a notably high proportion of people studying it (Wei & Su, 2012). The choice of this particular pair of languages also matched the lead author's language skills. Among the more than 1,300 Chinese-speaking survey participants, 120 met study criteria of (a) studying English, (b) having used Livemocha for at least two months, and (c) agreeing to be interviewed. These 120 survey participants were invited to

Table 1. *Descriptive Statistics of Survey Participants*

	English		Chinese		Spanish		Portuguese		Total	
	Percentage	*SD*	Percentage	*SD*	Percentage	*SD*	Percentage	*SD*	Percentage	*SD*
Male	54%	0.5	37%	0.48	50%	0.5	54%	0.5	47%	0.5
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Age	29.32	10.93	26.34	8.86	32.75	12.74	30.74	11.42	29.5	11.19
Years of education	14.69	2.21	13.58	2.49	14.34	1.99	14.44	2.17	14.2	2.29
Income*	11,439.54	24,068.69	3,897.95	13,605.6	7,330.31	17,930.98	9,433.59	20,181.82	7,659.32	19,156.09
Target language proficiency	1.62	0.68	1.38	0.57	1.40	0.60	1.47	0.63	1.44	0.62
Goals	3.12	0.99	3.34	0.92	3.48	0.78	3.33	0.85	3.32	0.91
Learning hours on Livemocha	4.02	3.19	3.76	3.27	3.39	2.90	4.13	3.15	3.80	3.15
Learning hours outside Livemocha	3.44	3.44	5.03	3.92	2.34	2.52	2.63	2.76	3.51	3.46
Number of Responses	1,042		1,318		1,046		768		4,174	

*Note. * Income is annual net income in USD.*

become case-study participants also, and of the 48 who agreed to do so, 20 were selected randomly. We then asked these 20 individuals for permission to access their data on Livemocha. None of the case-study participants had purchased premium courses on the site. The average age of the case-study participants was 27.7 years old (*SD* = 8.93), and 16 participants were females.

All 20 case-study participants were interviewed once either via phone or an instant messaging platform (depending on their preference) for approximately an hour and asked detailed questions about their usage of Livemocha and their experiences on the site. The interviews were semi-structured and had eighteen questions. All interviews were digitally recorded and transcribed (in the case of phone interviews), or archived (in the case of instant messaging).

Exercises

Before interviewing each case-study participant, the researchers manually retrieved all the public information on that participant's profile, including number of friends, list of courses they had enrolled in, writing exercises, and all the responses to their exercises that had been posted by other users. All writing exercises submitted prior to December 31, 2011 were manually documented. In all, we retrieved 253 writing and 275 speaking exercises. The writing exercises were part of the courses the participants were enrolled in; a typical prompt for such exercises would be to ask learners to describe something (e.g., "What did you do today?") using the vocabulary, grammar, and content they had learned from a course. Writing exercises were used to examine site usage, generate specific interview questions about individuals' experience of such usage, and examine individuals' progress (i.e., language accuracy and syntactic complexity) over time.

Measures

Learner Background

Our survey collected individual background data including respondents' self-reported age, gender, income level, education, linguistic background, and target language. The participants' socioeconomic status (SES) was measured through both income and education (Krieger, Williams, & Moss, 1997). Linguistic background was defined as a participant's main language, as per their survey responses.

Target Language Proficiency

Proficiency in the target language was self-reported by individuals in the survey on a scale of 1-3, with 1 being beginner and 3 being advanced. The scale was chosen because it corresponded to levels in their profile on Livemocha.

Attitudes toward the Site

Users' attitudes toward the site were measured by four survey items on a scale of 1-5, with 1 indicating strong disagreement and 5 strong agreement with the statement presented. A sample item from this section of the survey is, "I feel more comfortable communicating with native speakers on Livemocha than in face-to-face communication."

Goals

This item measured the target proficiency that participants hoped to attain by using Livemocha. The scale ranged from 1 (basic proficiency) to 4 (advanced proficiency).

Learning Hours

Learning hours were assessed via two self-reported variables: average hours spent studying on Livemocha per week, and average hours per week spent studying the target language outside of Livemocha.

Usage

To investigate usage over time, we examined exercise submissions by 20 case-study participants. This document type was chosen as it was the only site feature with time stamps. The observation period for a given case-study participant started at the time they signed up with Livemocha and ended on December 31, 2011. The discontinuation of exercise submission was used as a measure of attrition. The criteria for determining discontinuance of site usage were as follows: 1) if an individual never submitted any exercises after registration on the site, his or her "failure" date was set to four months after registration; 2) if an individual did not submit an exercise within four months of his or her previous submission, or submitted an exercise but beyond the four-month threshold, his or her failure date was set to the previous submission date plus four months. The threshold was approximately the average number of days from the previous submission (*Mean* = 35.4) plus one standard deviation (*SD* = 88). Since users tended to submit multiple exercises on the same day, same-day submissions by the same individual were counted as a single submission when calculating the means and the standard deviation.

Perceived Progress

Perceived progress was determined using survey data. The survey item covering overall perceived progress was on a scale of 1–4, with 1 indicating that the participants felt they had learned nothing, and 4 that they had learned a large amount. Items covering perceived progress in specific skills were ranked on a scale of 1–3, with 1 indicating that the site was not helpful for acquiring or improving the skill, and 3 that it was very helpful.

Progress

Two aspects of language development were examined for all writing exercises submitted by the participants: language accuracy and syntactic complexity. We used errors per T-unit (E/T) and error-free T-units (EFTs), as they normally are related to holistic ratings and short-term change (Wolfe-Quintero, Inagaki, & Kim, 1998). T-unit, or minimal terminable unit, refers to an independent clause and its dependent clause (Hunt, 1966). For example, "There was a man next door, and he was a teacher" has two T-units, and "There was a man next door who was a teacher" has one T-unit. There is no clear definition in the literature of what constitutes an error when calculating E/T and EFTs (Polio, 1997), so, in the current study, we used the sum of mechanical errors (i.e., capitalization and punctuation), lexical errors (i.e., spelling and word-choice), and grammatical errors (i.e., agreement and syntax). We used two coders for this data: a graduate student who had been an English teacher for more than 10 years, and an undergraduate who is a native English speaker. All disagreements that arose between the two coders regarding errors were discussed until they were resolved to the mutual satisfaction of both parties.

In terms of syntactic complexity, we used clauses per T-unit. Clauses are structures with a subject and a finite verb (Polio, 1997), including independent, adverbial, adjective, and nominal clauses. A value of 2 for clauses per T-unit means that the T-unit contains one independent clause and one other type of clause. Several studies have shown that clauses per T-unit is a robust measure, as it generally increases in a linear relationship to proficiency level, and is not affected by the task (Wolfe-Quintero, et al., 1998). 253 English writing exercises were coded to evaluate if there was any improvement in syntactic complexity and language accuracy over time.

Data Analysis

Stata 13 was used to conduct all elements of the quantitative analysis. To answer the first research question, regarding attitudes, descriptive statistics and open-ended questions from the survey were analyzed for evidence of participants' attitudes toward the site.

To answer the second research question, descriptive statistics and survival analysis of the writing exercises submitted by the case-study participants were analyzed for evidence of site use. Survival

analysis is a type of statistical analysis commonly used to estimate the odds of death/failure, or the length of time remaining until death/failure, in biological organisms and mechanical systems. In other words, the results of survival analysis will provide information on patterns and risks of a specific event over time (Singer & Willett, 1991); it avoids many of the statistical problems associated with other techniques because it treats time as the outcome (MacCullagh & Nelder, 1991).

To answer the third research question, regarding progress, we first used descriptive statistics derived from the survey to analyze student self-perceived progress. We then fit a two-level individual growth model using hierarchical linear modeling (HLM) with maximal likelihood estimates (Singer & Willett, 2003) to examine language accuracy and syntactic complexity from the participants' writing exercises. HLM is a type of regression model used to account for correlated errors in nested data structures (such as students from different schools and measures taken at different time points). As compared to multiple regression, HLM provides a more accurate estimation with larger standard errors, because the latter method considers the sources of statistical error more rigorously (Raudenbush & Bryk, 2002). The equation is as follows:

Level 1: $\text{Progress}_{ij} = \pi_{0j} + \pi_{1j}\ \text{Submission}_{ij} + \varepsilon_{ij}$ (equation 1)

Level 2: $\pi_{0j} = \beta_{00} + \beta_{01}\text{Proficiency}_j + \beta_{02}X_j + u_{0j}$

$\pi_{1j} = \beta_{10} + \beta_{11}\text{Proficiency}_j + \beta_{12k}X_j + u_{1j}$

In this equation, the dependent variable is learning outcomes (i.e., language accuracy and syntactic complexity) by participant *i* at submission *j*. Level 1 describes within-participant variation, reflecting the language accuracy and syntactic complexity of work submitted at different times by the same person. Our model used the time elapsed between registration and submission as the time variable; the second and later submissions were treated as opportunities for improvement in language accuracy and syntactic complexity, even if such submissions occurred many days after the user registered on the site or made their last submission. Level 2 explains between-participant variation. The participant-level covariates included participants' proficiency level in the target language; and X, which consisted of age, gender, years of education, income, hours spent learning weekly (on and off Livemocha), and number of friends on the site.

In addition to the quantitative data analysis, qualitative analysis was performed to analyze the open-ended questions in the survey. Interview data were coded using a bottom-up scheme focusing on the three main themes: attitudes, usage, and progress from the study (Miles & Huberman, 1994). NVivo was used to code the data. Results from qualitative analysis were used to supplement findings from the quantitative analysis.

RESULTS

Attitudes toward the Site

Among the four survey items measuring attitudes toward Livemocha, the most positive perceptions were that using the site increased users' motivation and self-confidence (see Table 2). 48% of the participants strongly agreed and 37% agreed that, after using Livemocha, they were motivated to spend more time learning a language on the site. In addition, 52% strongly agreed and 34% agreed that learning a language on Livemocha increased their self-confidence in their target language. A typical comment from the survey was, "The best thing on the site is the chatting option. To chat with native speakers gives me confidence". The majority of the case-study participants also took advantage of the site's online chat rooms to practice their English. One noted that this was the first time she had used English in her life outside of school, where she had studied English for eight years. The LLSNS experience rendered the English she learned "meaningful" and helped her to realize how much she had previously learned in school (case-study participant #4).

Most survey participants also reported feeling more comfortable communicating with native speakers via this type of Internet site, as compared to face-to-face communication: with 41% strongly agreeing and 30% agreeing that they felt more comfortable communicating with native speakers on Livemocha than face to face.

Individuals' responses that expressed frustration about negative feedback from peers were reverse coded: that is, with value 1 representing strong agreement with the statement *negative feedback from others on the website feels discouraging*. While some survey participants felt discouraged by negative feedback, overall, their perceptions were above neutral. Nevertheless, the typology of feedback that survey participants received and their criteria for considering it discouraging, remain unclear. Answers to one open-ended question in the survey, about the best aspect of the LLSNS, revealed a generally positive attitude toward receiving feedback and peer review. The survey participants said they appreciated the site's feedback feature as well as those peers who provided feedback to them. A typical comment from survey participants was, "Other people can correct my mistakes" (survey participant #23). Another survey respondent pointed out:

> The thing I like best about the website is the social part of it. In the first place it's very nice that you are getting feedback from other users (which I experience as very constructive in most cases). It's also really nice that you can help other people who are learning your language (survey participant #303).

Table 2. *Attitudes toward the Site, by Survey Participants' Main Language*

	English		Chinese		Spanish		Portuguese		Total	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
More motivated	4.26	0.78	4.20	0.82	4.43	0.74	4.36	0.78	4.31	0.79
More confident	4.24	0.82	4.19	0.83	4.55	0.67	4.45	0.72	4.35	0.78
More comfortable chatting online than in person	3.96	1.03	4.21	0.85	4.03	1.02	3.93	1.01	4.04	0.98
Positive attitudes towards correction	3.47	1.25	3.14	1.18	3.24	1.29	3.60	1.13	3.35	1.23
Number of responses	940		1,098		979		744		3,949	

Note. A 5-point Likert scale was used to determine the magnitude of individuals' attitudes.

Usage

To examine how users took advantage of the site's features, 528 writing and speaking exercises submitted by the twenty case-study participants were analyzed (see Table 3). On average, each case-study participant submitted 26.4 exercises, including 14 writing and 12.4 speaking exercises. Only one participant did not submit any writing exercises, while four did not submit any oral exercises.

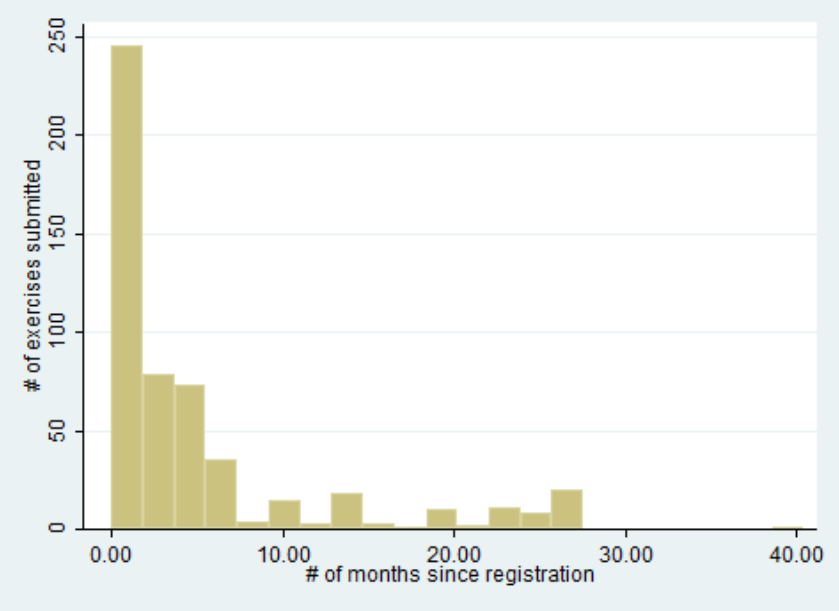

Figure 2. Distribution of numbers of exercises submitted over time

Figure 2 illustrates the numbers of exercises submitted by the case-study participants from their first submission to the end of 2011. More than 37% of exercises were submitted within one month of registration; and the distribution of the month they were submitted in is skewed to the right, with a long tail on the right-hand side indicating the small number of exercises submitted after two months. The average time at which the case-study participants submitted their speaking and writing exercises was 5.06 months after registration with a standard deviation of 7.27.

Table 3. *Numbers of Exercises Submitted by Each Case-Study Participant*

Participant	Number of oral exercises	Number of written exercises	Total number of exercises
1	0	15	15
2	12	11	23
3	0	0	0
4	9	9	18
5	46	51	97
6	0	3	3
7	12	10	22
8	5	6	11
9	9	12	21
10	4	11	15
11	20	20	40
12	27	18	45
13	6	9	15

14	8	8	16
15	47	49	96
16	7	8	15
17	14	14	28
18	20	20	40
19	0	2	2
20	2	4	6

Though most exercises were submitted during the first few months of site use, a couple of case-study participants persisted in submitting a small number of exercises even after periods of inactivity (see Figure 3). One case-study participant did not submit any exercises, and the number of participants who did not submit exercises rose from one to eight after the third month.

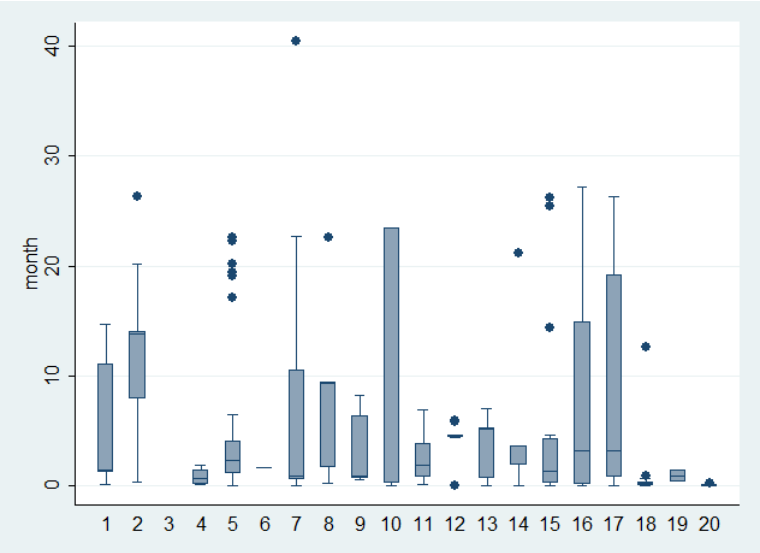

Figure 3. Months in which exercises were submitted by each participant.

The participants' first entry time occurred fairly early, approximately 0.33 months after registration. Their exit times for exercise submission ranged from 4.0 to 10.9 months, with a mean of 6.19 months and a median of 5.42 months. By 10.9 months after registration, all the participants had either discontinued use of the site altogether or did not use it regularly (defined as the failure to submit at least one exercise per quarter year). As shown in Figure 4, the survival rate dropped to 50% at around the five-month mark, and to 25% during the sixth month.

Survival analysis showed that two factors had a positive effect on the length of exercise submission (see Table 4). A 10-year increase in user age resulted in an 11% increase in the period during which exercises were submitted. Likewise, a one-unit increase in learning goal was associated with a 7% increase in the period of exercise submission. In other words, older people and those with more ambitious learning goals persisted longer than younger people and those with lesser learning goals.

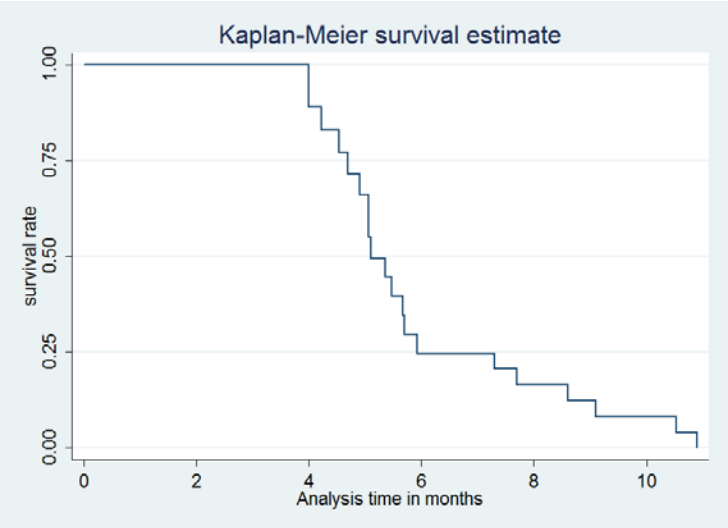

Figure 4. Survival rate over time.

Table 4. *Survival Analysis of Factors Predicting Site Usage*

	Coefficients	Robust standard errors
Male	-0.05	(-0.43)
Age	0.01*	(2.12)
Years of education	-0.01	(-0.46)
Income	0.00	(0.25)
Target language proficiency	0.04	(0.43)
Goals	0.07*	(2.50)
Learning hours on the site	-0.01	(-1.17)
Learning hours outside of the site	-0.01	(-0.52)
Constant	1.28**	(3.24)
N	78	

Note. t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$,

Progress

Individual comments concerning perceived learning progress on Livemocha are set forth in Table 5. More than 52% of the participants felt that they learned a lot, and an additional 37% reported making some progress. In addition, the participants reported high levels of perceived progress (on a scale of 1–3) in particular language skills, such as listening (2.74), speaking (2.70), writing (2.67), reading (2.64), and vocabulary (2.64).

Table 5. *Perceived Progress by Survey Participants' Main Language*

	English		Chinese		Spanish		Portuguese		Total	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Overall perceived progress	2.39	0.73	2.12	0.81	2.66	0.54	2.55	0.58	2.41	0.72
Progress in language skills										
Listening	2.69	0.54	2.64	0.55	2.86	0.37	2.79	0.44	2.74	0.49
Speaking	2.64	0.60	2.63	0.56	2.78	0.46	2.75	0.48	2.70	0.53
Reading	2.60	0.60	2.51	0.59	2.81	0.44	2.76	0.46	2.67	0.54
Writing	2.59	0.61	2.43	0.60	2.80	0.44	2.75	0.48	2.64	0.56
Vocabulary	2.61	0.57	2.53	0.57	2.74	0.48	2.68	0.52	2.64	0.54
Grammar	2.35	0.73	2.30	0.67	2.65	0.57	2.48	0.68	2.45	0.68
Number of survey participants	981		1,214		1,005		761		3,961	

Note. The scale for overall perceived progress was from 0 (i.e., learned nothing) to 3 (i.e., learned a lot). The scale for progress in each language skill ranged from 1 (i.e., learned nothing) to 3 (i.e., learned a lot).

Participants reported making the least progress in grammar (2.45). Some Livemocha courses offered specific grammar instruction sections, and some participants stated that they learned grammar through textual examples of complete sentences. One survey respondent reported that he did not have to struggle with difficult grammar expositions or exercises that required learners to piece the words together (survey respondent #355). One common theme among case-study participants was that, though they felt they did not receive enough grammar instruction from the site, they still felt they made significant improvements, because, for most of them, this was the first experience of using English in meaningful conversation with others.

Language Accuracy

We examined the language accuracy and syntactic complexity of 253 English writing exercises generated by our case-study participants to evaluate changes in these two areas over time. Among the case-study participants, the average word count per submission is 27.8, and words per sentence is 6.41. In addition, the average number of errors per T-unit was 2.0, and the error-free T-units were 3.4 (see Table 6). The results of HLM analysis (see Table 7) showed that the longer learners stayed on Livemocha, the more likely their T-units were to contain errors; however, time spent on the site did not affect their number of error-free T-units. Interestingly, learners with a high self-reported level of proficiency in the target language made more errors per T-unit than others, and their number of error-free T-units was not significantly different from those with low self-reported levels of proficiency. Proficiency in the target language did not change the growth of language accuracy over time.

Table 6. *Descriptive Statistics of Language Accuracy and Syntactic Complexity*

	Mean	SD	Min	Max
Word count	27.78	14.33	0	55
Sentence count	5.21	3.35	1	24
Words per sentence	6.41	3.46	0	20
Errors per T-unit	1.97	1.53	0	9
Error-free T-units	3.41	4.05	0	30
Clauses per T-unit	1.07	0.17	0	2

Learners with higher learning goals made fewer errors per T-unit than users with less ambitious goals, but this effect did not appear in regard to the number of error-free T-units. Learners with higher goals decreased their errors per T-unit faster than those with lower goals, but again, error-free T-units remained unaffected by users' goal levels. Participants who spent more time on Livemocha every week had more errors per T-unit than those who spent less time on Livemocha and had fewer error-free T-unit; those who spent more time studying their L2 outside of Livemocha had fewer errors per T-unit, but about the same number of error-free T-units as others. In addition, participants' choice of whether to spend the majority of their study time on or off Livemocha did not impact the growth rate of their language accuracy.

Table 7. *Hierarchical Linear Modeling for Variables Predicting Language Accuracy*

	Errors per T-unit	Error-free T-units
Months	0.38**	-0.08
	(2.88)	(-0.25)
Male	2.09***	-1.30
	(4.89)	(-1.19)
Age	0.27***	-0.16
	(4.67)	(-1.09)
Target language proficiency	2.01***	-0.14
	(4.72)	(-0.13)
Learning goals	-12.60**	1.44
	(-2.71)	(0.12)
Learning hours on Livemocha	0.19***	-0.29*
	(3.33)	(-2.02)
Learning hours outside of Livemocha	-0.34***	0.21
	(-6.97)	(1.70)
Months X Male	-0.22*	0.37
	(-2.40)	(1.62)
Months X Age	0.03*	0.01
	(2.05)	(0.30)
Months X Language proficiency	0.08	0.51
	(0.69)	(1.71)
Months X Goals	-3.39**	-0.44
	(-2.88)	(-0.15)
Months X Hours on Livemocha	0.01	-0.07
	(0.56)	(-1.89)
Months X Hours outside of Livemocha	-0.01	-0.03
	(-0.74)	(-1.30)
Fixed effect constant	1.20*	-0.65
	(2.43)	(-0.52)
Random effect		
Constant	-26.61***	-20.25
	(-4.67)	(-0.01)
Residuals	0.06	1.00***
	(1.26)	(19.67)

Note. Control variables included years of education, income, number of friends on Livemocha, and integrative and instrumental orientation. t statistics in parentheses. * *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001

Syntactic Complexity

The complexity of sentence structure increased as the participants continued to submit writing exercises to the LLSNS (see Table 8). Proficiency in the target language impacted neither syntactic complexity nor its growth over time. Ambitious learning goals had a negative impact on both syntactic complexity and its growth over time. The division of learning hours between Livemocha and outside venues affected neither syntactic complexity nor its growth.

Table 8. *Hierarchical Linear Modeling for Variables Predicting Syntactic Complexity*

	Clauses per T-unit
Months	0.05*
	(2.28)
Male	-0.01
	(-0.17)
Age	0.02*
	(2.07)
Target language proficiency	0.11
	(1.66)
Learning goals	-2.10**
	(-2.88)
Learning hours on Livemocha	0.01
	(0.74)
Learning hours outside of Livemocha	-0.01
	(-1.58)
Months X Male	-0.04**
	(-3.10)
Months X Age	0.00
	(0.60)
Months X Language proficiency	-0.02
	(-0.88)
Months X Goals	-0.42*
	(-2.30)
Months X Hours on Livemocha	0.00
	(0.43)
Months X Hours outside of Livemocha	0.00
	(0.23)
Fixed effect constant	0.21**
	(2.67)
Random effect	
Constant	-22.06***
	(-3.64)

Residuals	-1.79***
	(-35.18)

Notes. Control variables included years of education, income, number of friends on Livemocha, and integrative and instrumental orientation. t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

DISCUSSION

Attitudes

The improvements we found in perceived self-confidence and motivation may be attributable to the participants' access to and ability to communicate with native speakers of their target language (Kramsch, A'Ness, & Lam, 2000). Unlike traditional bottom-up learning that starts with alphabets and phonemes and later moves on to words, sentences and grammar, learners on the LLSNS quickly adopted ready-to-use sentences and had ample opportunities to practice with native speakers.

Our findings also showed that the participants felt more comfortable communicating with native speakers on the site than face to face. This is consistent with previous research findings that communicating online reduces anxiety (Warschauer, 1996a, 1996b; Young, 2003). Learners in online environments may experience less stress than traditional learners, because they have more time to review their output before sending it to native speakers (Warschauer, 1999). As one user commented,

> It saves embarrassment which you can get if you were in a language class when you make mistakes and there is no rushing for tests as you can go in your own pace and slow down with your own time. In classes it can get quite competitive so none of that is here (survey participant #394).

Though Stevenson and Liu (2010) reported that some individuals were hesitant to use LLSNSs due to their lack of interest in building social relationships, our findings suggested the opposite. Unlike learners in the traditional L2 classroom, which is often isolated from both real-world contexts and long-term communicative engagement (Thorne, Black, & Sykes, 2009), our participants felt it was natural to engage in meaningful conversation with native speakers on the LLSNS. The increased motivation and self-confidence they reported vis-à-vis the target language suggests that LLSNSs may provide valuable opportunities for L2 socialization and engagement.

Usage and Attrition

Learning on this LLSNS enables users to connect with native-speaker communities, but whether learners can sustain such contact remains a crucial question. Chen (2013) reported an increased number of information exchanges involving two case-study participants using Facebook, but our study of Livemocha found decreased usage over time. All case-study participants eventually discontinued submitting exercises to the site, which may suggest lesson attrition, but the reasons for this remain unknown. For instance, it might be due to the completion of lessons, or due to the participants continuing to use the site but with a focus on features other than exercise submission.

The issue of attrition is related to learner autonomy and the provision of access to educational materials. Scholars have argued that in CALL environments, autonomous learning—or, learning initiated and directed by learners (Littlewood, 1996)—may help learners modify input and output, monitor learning progress, develop metacognitive skills, and prioritize their learning (Darawawang & Reinders, 2010). However, the development of truly autonomous learners is likely to require more than just having access to resources (Nielson, 2011). The mere availability of self-study materials does not guarantee that they will be used (Jones, 2001), and learners seem to need additional types of support and guidance (Mozzon-McPherson, 2007). This is especially the case in out-of-school learning contexts and among adult

learners. As shown by Nielson, participants are often enthusiastic at the beginning of an intervention, and yet may not take full advantage of self-access centers and commercial self-study packages. In Nielson's aforementioned study, half of the participants did not even access the software. Without teachers or peers to drive the CALL process, it may be difficult to engage users over long periods of time (Jones, 2001).

Learners require high-quality learning materials, advice, and training (Fernández-Toro, 1999), as well as interaction and a sense of community (Blake, 2008; Rovai, 2002), to self-direct their learning simply. Interestingly enough, Livemocha provides all the features mentioned above, and yet also suffers a considerable amount of lesson attrition. This problem, however, may not be unique to Livemocha or to LLSNSs in general. Studies of other types of technology use for autonomous learning – whether language-instruction software like Rosetta Stone (Nielson, 2011) or within Massive Open Online Courses (MOOCs; Rosé, et al., 2014) – also show high levels of attrition. Although Nielson suggests that providing learners with the means to interact with other learners, tutors, or native speakers may help to decrease attrition rates, the present study suggests providing communication tools does not automatically lead to persistence.

Though data on attrition rates may seem discouraging, they should not be seen as overriding the potential benefits that LLSNSs. Livemocha had 13 million users as of June 2012, which is 4.1 million more students than were enrolled in foreign-language classes in all U.S. public schools combined (American Council on the Teaching of Foreign Languages, 2011), while the number of students enrolled in languages other than English in U.S. higher education has recently been estimated at 1.7 million (Modern Language Association, 2009). Even if the average learning gains per student are small, LLSNSs can have a large total impact due to their size. This is somewhat parallel to the situation of MOOCs, which suffer a very high attrition rate, yet still have a strong overall educational impact due to the large number of enrollees (Koller, 2012).

Progress

Perceived progress in listening and speaking points to an important potential benefit of LLSNSs. Previous research on online L2 courses has primarily focused on reading and writing with computer-based tools (e.g., Chen, 2006; Murphy, 2007); however, our data showed greater perceived progress in listening and speaking than in reading and writing. Although this difference was not statistically significant, the perception of listening and speaking progress may result from the amount of oral practice, self-expression, and social interaction that LLSNSs afford to their members. If learners develop the skill of communicating with native speakers through SNSs, they can build relationships with them and participate in their communities in the target language (see discussion in Harrison & Thomas, 2009; McInnerney & Roberts, 2004). LLSNSs appear to create a natural environment in which users can learn and practice languages, while further including specific language-learning components. Livemocha users share similar goals—learning a language—which adds to their perception that the site is an encouraging environment where they can exchange their language expertise. Furthermore, the online presence of numerous ready-to-chat native speakers makes LLSNSs more interactive than traditional classrooms. One survey participant described the Livemocha site as an "open-source language program" (survey participant #248) in the sense that all users are able to participate as they want. Many of our respondents also stated that they appreciated the site's integration of community and social learning. As one put it, "I like the way the website integrates the idea of community learning, where I could meet people, who are truly native speakers and hence, are knowledgeable about the language for which I am learning, and I can exchange language ideas" (survey participant #392).

Regarding actual as distinct from perceived L2 progress, our findings suggest that using Livemocha may increase syntactic complexity, with the important caveat that errors per T-unit appear to increase in tandem with this. The literature on computer-mediated communication (CMC) has demonstrated increasingly complex syntactic structures in online communication (Shang, 2007), but no consensus on

how the use of CMC or SNSs may impact language accuracy. On the one hand, some studies show that online students have more opportunities to monitor their language production than traditional students do (Warschauer, 1996b, 1999). On the other hand, language use on the Internet is often criticized as being less correct and less coherent than other forms of language use, and as having disrupted adjacency (Herring, 1999; Kern, 2006). Even with a well-designed curriculum or explicit error correction, some studies of online learning have failed to find improvement in language accuracy (Vinagre & Muñoz, 2011; Young, 2003). It is also possible that students make more errors over time because they are writing longer sentences containing more challenging vocabulary, comparable to the well-known u-shaped child language learning curve in which infants make more errors in speech as their language develops, before accuracy improves again later (Bever, 1982; MacKay, 1982). Further study is needed to investigate more fully why measures of student accuracy decrease over time, and why this stands in contrast to students' perceived progress in all aspects of language learning.

CONCLUSION

LLSNSs offer the promise of bringing together tutorial software and opportunities to learn from interaction with native speakers. The present study helps to confirm the positive potential of LLSNSs for language learning, while also revealing possible problems, including lack of long-term persistence and failure to contribute to learner accuracy.

Several limitations of the current study need to be noted. First, as there was no control group, it is not possible to attribute any improvement in language skills to the use of Livemocha. Second, due to limits in our access to site data, we could not measure the progress of participants in each skill and compare it directly with their perceived progress. Lastly, we collected and analyzed the times at which the case-study participants submitted speaking exercises, but not the content of each speaking exercise.

We suggest that future research use more robust measures to examine students' language development in these environments. These could include measures of speaking and listening, which we did not assess, and more sophisticated measures of language accuracy that prioritize certain errors (since, for example, a misplaced comma may not be as important as an incorrectly conjugated verb). In addition to linguistic accuracy, other aspects of L2 play important roles in language learning in a CMC environment, including language fluency (Ellis, 2003, 2008), communicative competence (Blake, 2009; Smith, 2003), intercultural awareness (Bauer, deBenedette, Furstenberg, Levet, & Waryn, 2006; Belz, 2003), and identity development (Black, 2006; Lam, 2006), and these aspects should be assessed as well. Broader assessments are required to evaluate whether the perceived benefits of LLSNs match the actual progress made by their users across a wide range of language learning outcomes.

NOTES

1. Livemocha is now owned by Rosetta Stone. The acquisition was announced on April 2, 2013 (see http://livemocha.com/blog/2013/04/02/a-letter-from-our-ceo-michael-schutzler-2/). This study was conducted using its pre-acquisition legacy version.
2. At the time of writing (2014), Duolingo has more global traffic than Livemocha, according to global rank data published by Alexa.
3. The badge feature was removed since Rosetta Stone acquired Livemocha.
4. The premium course feature was changed since Rosetta Stone acquired Livemocha. All courses can be unlocked using either participation points or cash.

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