European Association for Computer Assisted Language Learning

THE EUROCALL REVIEW

Volume 24, Number 2, September 2016

Editor: Ana Gimeno

Associate editor: David Perry

ISSN: 1695-2618

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Research paper

Could a multimodal dictionary serve as a learning tool? An examination of the impact of technologically enhanced visual glosses on L2 text comprehension

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Abstract

This study examines the efficacy of a multimodal online bilingual dictionary based on cognitive linguistics in order to explore the advantages and limitations of explicit multimodal L2 vocabulary learning. Previous studies have examined the efficacy of the verbal and visual representation of words while reading L2 texts, concluding that it facilitates incidental word retention. This study explores other potentials of multimodal L2 vocabulary learning: explicit learning with a multimodal dictionary could enhance not only word retention, but also text comprehension; the dictionary could serve not only as a reference tool, but also as a learning tool; and technology-enhanced visual glosses could facilitate deeper text comprehension. To verify these claims, this study investigates the effects of multimodal representations on Japanese students learning L2 locative prepositions by developing two online dictionaries, one with static pictures and one with animations. The findings show the advantage of such dictionaries in explicit learning; however, no significant differences are found between the two types of visual glosses, either in the vocabulary or in the listening tests. This study confirms the effectiveness of multimodal L2 materials, but also emphasizes the need for further research into making technologically enhanced materials more effective.

Keywords: Animated image, explicit learning, multimodal glosses, online dictionary, prepositions, L2 vocabulary acquisition.

1. Introduction

Many studies have examined and reported the positive effects of visual glosses (e.g., pictures or images) in second language (L2) vocabulary acquisition in multimodal environments (Chun & Plass, 1996; Lomicka, 1998; Al-Seghayer, 2001; Yoshii & Fraitz, 2002; Yeh & Wang, 2003; Sato & Suzuki, 2010). These results are underpinned by the Dual Coding Theory (Paivio, 1971) for multimedia learning (Mayer & Sim, 1994), which states that presenting information in both verbal and visual modes leads to longer retention of the target information than with only one code. Such representation is easily implemented under a multimodal environment, where several types of glosses can be displayed on a single screen. Owing to the nature of multimodal information presentation, recent language learning materials contain not only languages and still pictures, but also sounds or animations.

Despite the efficacy of visual glosses, however, this study emphasizes that overestimating multimodal capabilities may limit glosses' effectiveness. Our study posits three limitations that previous studies did not discuss. The first challenge is the substantial focus on incidental learning, even though explicit instruction can have beneficial effects (Ellis, 1995; Groot, 2000; Boers, 2013). In that respect, the effects of visual glosses should be examined for explicit L2 vocabulary learning. Furthermore, the target vocabulary should be selected based on a theoretical criterion. Previous studies have chosen the target vocabulary using frequency, which indicates the amount of

words needed for successful L2 vocabulary learning. However, Littlemore (2009) stated that vocabulary-depth is more crucial than language-breadth in some cases. Finally, previous studies failed to examine the efficacy of different visual gloss configurations depicting the same image. Instead, they tended to focus on the appropriate combination of different glosses; Chun & Plass (1996) claim the combination of verbal and pictorial glosses is more effective in incidental L2 vocabulary learning than only presenting verbal or pictorial gloss. Yeh & Wang (2003) also stressed that the combination of verbal and pictorial glosses can increase target vocabulary retention more than integrating three gloss types: verbal, picture, and sound, and only one gloss type. As information presentation with multimodal functions has been developing, the impact of different visual glosses based on the same image should be examined.

2. From reference tool to learning tool

Taking these challenges into consideration, this study revalidates the efficacy of multimodal visual glosses in L2 vocabulary learning from the following perspectives. This study would like to focus on explicit learning to increase students' language-depth and not language-breadth. Boers (2013) acknowledges incidental L2 vocabulary learning is ideal, but claims explicit learning should be utilized under the condition that time for learning is limited. Groot (2000) also states that explicit instruction is effective especially in a short period of learning time.

This study thus selects L2 prepositions as the target vocabulary for students to learn explicitly. As the target vocabulary is polysemic, it is considered difficult to acquire. Prepositions appear very frequently in discourse, but learners do not always understand them (Lindstromberg, 1996). They tend to learn prepositions as idioms or chunks, but they cannot use them according to the context, relying only on memorization (Lindstromberg, 2001). Despite the semantic complexity, inappropriate use of the senses might lead to a change of meaning (Ngu & Rethinasamy, 2006). With regard to learning such vocabulary with a complicated semantic network, Ellis (1995, p.103) stresses that "acquisition of word meanings requires explicit learning processes with deep processing strategies like semantic elaboration and imagery mediation resulting in better acquisition." Additionally, a linguistic theory also emphasizes that an image could motivate each sense of a polysemous word, and as a result, organize a semantic network where all the senses are conceptually motivated with respect to each other. The image is defined as an image schema, which is a key term of Cognitive Linguistics. Johnson (1987) defines image schemata as "abstract patterns in our experience and understanding that are not propositional" (p. 2). Figure 1 shows the image schema of the preposition "over" (Dewell, 1994). The image schema is an object, which conceptualizes a prototypical sense of *over* (e.g. "The plane is flying *over* the mountain.") and then can be extended into other figurative senses (Langacker, 1987) such as "She got *over* her flu." Such metaphorical extension mediated by the image schema results in a semantic network, in which all the senses of the word are cohesively embedded.
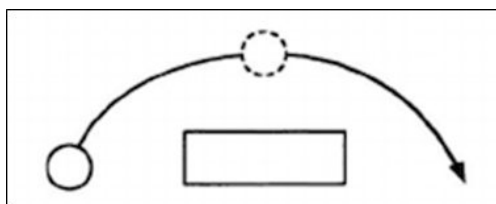
Figure 1. Image schema of over (Dewell, 1994).

Based on this advantage of the image schema, this study applied it to visual glosses for learning L2 prepositions. Boers (2004) suggests that metaphorical awareness facilitates L2 learning and information tends to be easily elicited once it is linked with a semantic network. As some studies recognize the positive impact of L2 vocabulary learning from the perspective of Cognitive Linguistics (Boers, 2013; Cho, 2010; Morimoto & Loewen, 2007; Yasuda, 2010), the advantage this study hypothesizes would be seen in L2 vocabulary learning within a multimodal environment.

Finally, this study examines the effectiveness of technologically advanced image schemata as visual glosses, so three-dimensional (3D) visual glosses are developed.

Thus, as the image schema in Figure 1 is shaped as a result of the embodiment of our bodily experience (Lakoff, 1987), the relationship between the elements in such a schematic image should be displayed not in a planar, but tactile way, to approximate our perception, which would serve as a more effective visual gloss for L2 learning. In fact, Littlemore (2009) also claims that 3D diagrams might be useful when displayed dynamically for L2 learning.

3. A web-based multimodal dictionary as a learning tool

To illustrate the efficacy of the image-schema glosses under a multimodal environment, two web-based bilingual dictionaries were developed. Each dictionary dealt with eight L2 prepositions ("above", "across", "along", "below", "in", "into", "on", "over"), all of which depicted a spatial relationship between objects and held both literal and figurative senses. Figure 2 is the sample page of the dictionary. On the left page, indexes of the word are shown, whereas the right page shows the example sentences with L1 translation and the visual gloss based on the image schema developed by conceptualizing the schematic sense of the preposition "along." Figure 3, on the other hand, illustrates the other dictionary with 3D visual glosses, which illustrates the same schematic image as Figure 2, but the image was developed with 3D animation to display the image as if the user perceives the situation (see Figure 4). This is based on the supposition that that image schema was the embodiment of our daily experience, so the schematic images should be built not from the objective viewpoint like Figure 2, but from a subjective one as if those who look at the image were at the spatial situation. Both dictionaries included the same verbal glosses, which were extracted from an English-Japanese dictionary (Eds. Tanaka, Takeda, & Kawade, 2003) with the permission of the chief editor.

This study postulates that a technologically enhanced dictionary can serve as both a reference tool and a learning tool for students acquiring the target vocabulary. The dictionary has traditionally been used to provide word meanings to help learners comprehend texts or to produce sentences, rather than as a resource to acquire vocabulary knowledge explicitly. A multimodal dictionary with several types of glosses, however, increases the saliency of target lexical items and their linguistic features. This creates the ideal environment for L2 vocabulary acquisition (Chapelle, 1998) and therefore leads to effective learning of the target vocabulary, although the literature has discussed the advantages of computer-assisted visual glosses mostly in terms of incidental learning.
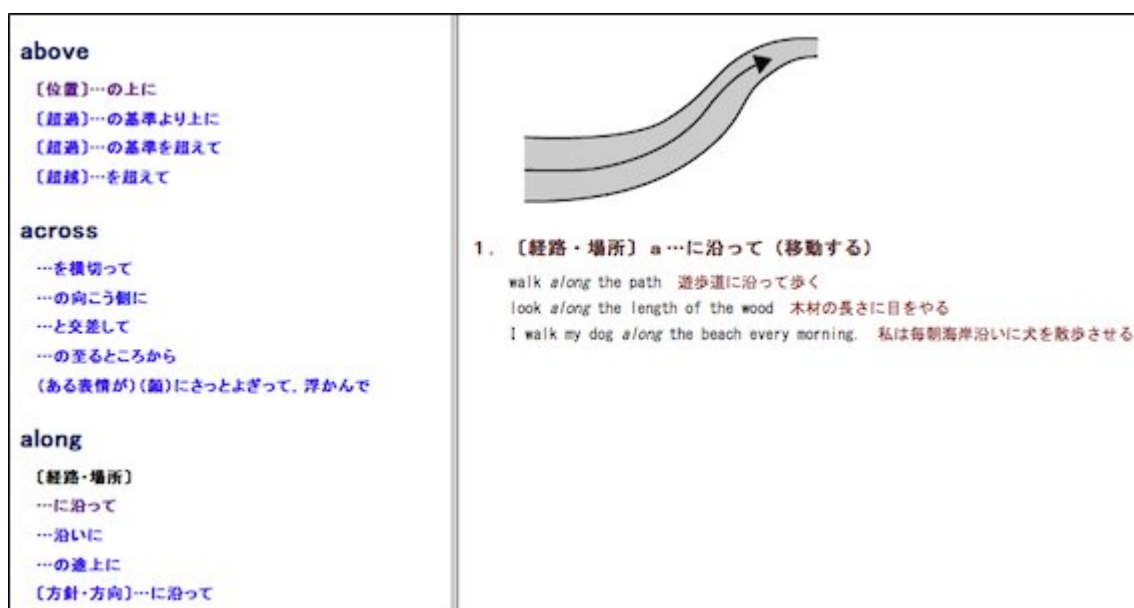

Figure 2. Web-based dictionary with 2D visual gloss.

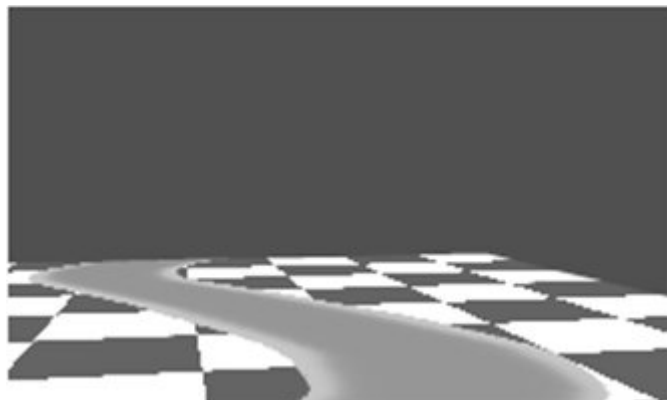Figure 3. Web-based dictionary with 3D visual gloss.

Figure 4. Animation of the schematic image of "along".

Furthermore, based on Ellis' (1995) claim that word meaning acquisition requires semantic elaboration and imagery mediation, this study hypothesizes that explicit L2 preposition learning using this dictionary will increase learners' awareness of the interrelationship between both words (Keane et al., 1997) and also the words' organized semantic networks where their literal and figurative senses are reciprocally motivated. This will lead to effective vocabulary learning: selecting an appropriate word in various contexts L2 learners encounter. It is true that several studies have already concluded the advantages of animation for L2 learning (Sundberg, 1998; Al-Seghayer, 2001; Ling & Tseng, 2012). Therefore, our research questions for this research are as follows:

1. When Japanese L2 learners learn the locative prepositions with the multimodal bilingual dictionary, could their text comprehension be enhanced more than if they do not use it?
2. When they learn the words with the dictionary including three-dimensional animated aids, could their listening comprehension and sentence retention be enhanced more than when they use the dictionary with static visual glosses?

We will explain the detail of our experimental research in the next section.

4. Studies

Two experimental studies were conducted to examine the above research questions. Below are the descriptions of both sequentially.

4.1. Study 1

4.1.1. Participants

Fifty-two undergraduate students from a Japanese university participated in this research. As they major in either agriculture or technology, they do not specialize in English-related subjects. However, they are exposed to English during their studies; there is at least one compulsory English class for both freshman and sophomore students, while the junior and senior students have to read English journal articles related to their majors. In these respects, it would be estimated that their English language proficiency is at the lower to higher intermediate level. They were randomly divided into the control (n=26) and experimental (n=26) groups. Considering their constant exposure to English and homogenous English language proficiency, no test was conducted to divide them into these groups.

The experimental study could not be conducted simultaneously in the same location. Some sessions were held in the university's computer room, while others were conducted in the author's office with a maximum of five participants per session. All the studies were conducted under the author's supervision.

4.1.2. Procedure

A personal computer with internet access was allocated to each participant (Windows OS). They were first asked to start the OS and to access the Moodle site developed only for this research.

The pre-test was then conducted on the Moodle site. The test consisted of forty-five fill-in-the-blank questions, where participants would provide the appropriate prepositions. Each question consisted of an English sentence with a blank and its Japanese translation. Within 20 minutes, the participants were asked to choose the most suitable preposition out of eight locative prepositions (i.e., above, across, along, below, in, into, on, over). This test was identical to the one used in my previous study (Sato & Suzuki, 2010). After the test, the correct answer was not given to the participants, and the next task was assigned.

The participants were asked to access the web-based bilingual dictionary for the eight target prepositions illustrated in Figure 2 and 3. They would then independently study the target prepositions with reference to the visual glosses. The images were different for each group: the control group referred to two-dimensional images (see Figure 2) derived from a paper dictionary (Tanaka, Takeda, & Kawade -Eds.-, 2003). The experimental group referred to three-dimensional animations of the images the author developed (Figures 3 and 4). Within 10 minutes, the participants were asked to understand the connections between the image and the words' meanings.

The post-test was conducted immediately after the ten-minute study session. The test was the same as the pre-test, but the question order was randomized by the Moodle function. The method and duration of the post-test was identical to the pre-test. As this test comprised the final task, the participants were permitted to leave the PC room or the author's office after they had completed the assessment.

4.1.3. Analysis

As all tests were conducted on Moodle, the test answers were automatically scored as the author set one correct answer as one point. The total scores were subsequently analyzed through a two-way (tests and treatments) repeated ANOVA measures.

4.1.4. Findings

In the control group, the average pre-test score was 19.23 (SD=4.30) and that of the post-test was 24.58 (SD=4.07). As for the experimental group, the average pre-test and post-test scores respectively were 19.23 (SD=4.18) and 24.31 (SD=3.47). The results from the analysis showed that both groups' participants received higher scores in the post-test than those in the pre-test. As the average pre-test score of both groups was identical, the participants' prior knowledge of the target prepositions would be almost the same; the score difference in the post-test could, therefore, be attributed to the treatments.

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As seen in Table 1, the ANOVA result showed a significant difference in the within-subject factor (F (1.50) = 112.49, p<.05), whereas no significant difference was obtained in the between-subjects factor (F (1.50) = 0.02, p>.05).

A = Image				
B = Test				
SV	SS	df	MS	F
A	0.4712	1	0.4712	
subj	1343.2500	50	26.8650	0.02 ns
B	706.1635	1	706.1635	112.49 **
AxB	0.4712	1	0.4712	
SxB	313.8654	50	6.2773	0.08 ns
Total	2364.2212	103	+p<.10 *p<.05	**p<.01

Table 1: Results of the ANOVA analysis.

The significant difference in the within-subject factor supports the claim of previous CALL studies (e.g. Chun & Plass, 1996), stating that representing the target knowledge with both visual and verbal glosses could better facilitate vocabulary learning. On the other hand, no significant difference in the between-subject factor somewhat contradicts previous studies (e.g. Al-Seghayer, 2001), which claim that animation glosses could better facilitate L2 vocabulary acquisition. As a result, the first study's results support the first research question but not the second. Therefore, a second study was conducted with the same treatment but a different research design.

4.2. Study 2

The second study examined how multimodal dictionaries facilitated listening to texts containing the target prepositions. As this study examined our second research question, our focus was only on the comparison between the treatments. We developed a fictional story that included the target prepositions as well as fifteen true-false questions about the story; participants needed to infer the answers to these questions by properly interpreting the prepositions' spatial relationship. This reasoning task was based on how spatiality is crucial in constructing a text's situation model referring to the deepest comprehension level (Zwaan & Radvansky, 1998).

4.2.1. Participants

Twenty college students joined this study. As all of them had participated in the first study, they simply remained in their original groups (9 in control, 11 in experimental).

4.2.2. Procedure

This study was conducted solely online through Moodle, but we could observe whether they had properly conducted the tasks because of Moodle's management functions. The participants were asked to access the student Moodle site and to read the procedures displayed. The first task required participants to listen to the fictional story three times, where a woman provides directions to her friend on how to reach her flat from the nearest station (see Appendix 2). The story was read by a text-to-speech application (i.e., Speak it!) in American English, as this accent was familiar to the Japanese participants. After listening to the story, the participants were asked to understand the relationship behind the senses of the target prepositions with reference to the images in the dictionary in the same way as they did in the first study. They then answered fifteen true or false reasoning questions. These questions could not be answered correctly, even if they had memorized the text, which meant learners needed to have deeper textual comprehension in order to provide the correct responses.

4.2.3. Analysis

As in the first study, the participants' answers were automatically collected and scored, and each correct answer was calculated as one point. The scores of each group were analyzed with a Mann-Whitney U test.

4.2.4. Findings

The average score of each group in the reasoning task is discussed below. The score of the control group was 13.00, whereas that of the experimental group was 8.46, which seems to be a large score difference. However, based on the U test's results, no significant difference was obtained ($p=0.08 >.05$), although it was marginally significant at the 10% level. This result may indicate that two-dimensional images can better enhance deeper text comprehension than animated images despite the lack of significant difference between the groups. Therefore, our second research question was denied not only in the first study but also in the second study.

5. Discussion and conclusion

This study addresses the effectiveness of technology-enhanced visual glosses in explicit L2 preposition instruction. To test our hypotheses, two experimental studies were conducted on preposition acquisition using multimodal bilingual dictionaries: one of which displayed each word's two-dimensional image schema while the other showed 3D animations of the schema. The findings showed that the visual glosses enhanced L2 vocabulary acquisition, regardless of the images' configuration. On the other hand, no advantage was found in the technology-enhanced visual glosses, which showed the same result as obtained in our previous studies (i.e., Sato & Suzuki, 2010, 2011; Sato, Lai, & Burden, 2014).

The results could be interpreted in terms of the characteristics of the image schema and the influence of learner factors. In the field of Cognitive Linguistics, from which the image schema theory was derived, schematic images have flexibility and changeability in terms of their foregrounding, rotation, and focusing (Langacker, 1987). This implies that simple images are superior because they allow the learners to change the images in their minds to apply the images to each context, whereas the animated images may prevent learners from modifying the images due to their fixed configuration. Furthermore, individual factors may have affected the test results. Sato, Lai, & Burden (2014) suggest the influence of information processing styles, namely holistic or analytic cognitive style (Littlemore, 2001); this is based on Boers and Lindstromberg's (2008) claim that L2 learning in the Cognitive Linguistics approach would be more suitable for those with holistic cognitive styles than those with analytic cognitive styles.

This study's results show a pedagogical implication in the use of multimodal dictionaries in language classrooms. When L2 learners use online dictionaries accessible on their computers or mobile devices, positive learning effects are expected regardless of whether they use the dictionaries for their incidental or intentional tasks, even though their devices do not hold technologically advanced functions. As onscreen presentation with the multimodal functions can make target language and their linguistic features salient, a multimodal dictionary can be used as not only a reference tool but also a learning tool (Pachler, 2001). As an increasing number of institutions recommend that their students bring their own devices into their classrooms, this study shows that technological functions of personal devices would not cause a big difference in students' learning as long as web-based dictionaries are accessible and that more active use of the dictionaries for both incidental and intentional tasks are recommended.

There are some limitations to this study. In the first study, more analysis should have been conducted, such as a delayed test or a production task to write sentences using the prepositions. As for the second study, the number of the participants was not large enough to conduct a comparative analysis. Furthermore, the data's validity could not be confirmed because all the tasks were conducted online without our observation. However, we believe that this study is not unreliable as our previous studies using different research designs received the same result (i.e., no difference between the treatments). To validate our findings and to optimize technological functions in CALL, future research is required: conducting an onsite study with a larger number of participants and taking into account individual learner factors.

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Appendix 1

Links of the online bilingual dictionary for English locative prepositions

- Dictionary with two-dimensional static images: http://goo.gl/seLOdk
- Dictionary with animated images: http://goo.gl/OCfI3A

* Click A, B, I, or O, and you will find the glosses of each target preposition as shown in Figure 2 and 3.

* Permission to use the sample sentences and translations was given by the chief editor of an English-Japanese dictionary (Tanaka, Takeda & Kawade -Eds.-, 2003) on condition that they were used only for research purposes.

Appendix 2

The script and questions for the listening task.

Dear Ken,

Thanks for your mail. I will tell you how to get to my flat.

When you come out of Hammersmith station, you'll see a market across the street, which is Oxford Street. Turn right into Oxford Street and walk along the street towards St. Stephen's Church. Pass the church on the right side and continue straight along the road. On the way, you'll see a pub called Queen's Pub. Just after the pub, on the left, is another pub called King's pub. Turn right at the signpost "King's Road" and walk along the path until you come to a bridge. Don't cross over it but turn right and keep on walking along the river until you reach a restaurant called "Charles".

Turn right into the narrow road in front of the restaurant. Follow the road and turn left just before you reach the park. At the end of this road is a row of houses. I live in the house in the middle. It's number 3, and the number is on the door. The window of my room is on the second floor above the front door. Call my name when you get there, and I should hear you. If I'm not in, please find a spare key in the bucket which is upside down on the step beside your feet? You can find it when you turn the bucket over.

Best regards,

Lucy

True or False Questions:

1. When Ken goes back to the station on foot, he will turn right towards the Charles restaurant.
2. Lucy's room is above house number 3.
3. The river is located on the left side of Lucy's house.
4. St. Stephen's Church is on the same side of Oxford Street as King's pub.
5. The spare key is covered with the bucket.
6. King's road is along the river.
7. The spare key is on the ground.
8. The number of the house is above the front door.
9. The park is along the river.
10. King's pub is the farthest from the station out of King's pub, Queen's pub and Lucy's house.
11. From the window of my room, the station can be seen.
12. Lucy's house is in Oxford Street on the opposite side of King's pub.
13. The Market is on the same side of Oxford Street as King's pub.
14. There are houses on each side of Lucy's house.
15. Ken will turn right into the road in front of Charles restaurant.

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Research paper

Usage and efficacy of electronic dictionaries for a language without word boundaries

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Abstract

There is cumulative evidence suggesting that hyper-glossing facilitates lower-level processing and enhances reading comprehension. There are plentiful studies on electronic dictionaries for English. However, research on e-dictionaries for languages with no boundaries between words is still scarce. The main aim for the current study is to investigate the usage and efficacy of e-dictionaries for Japanese language learners. This article reports the results of two studies concerning e-dictionaries: a survey study investigating the use of e-dictionaries (with a particular focus on *e-glossaries* that change a digital text into a hypertext) by L2 learners of Japanese, and a comparative study examining existing e-glossaries to evaluate whether they provide the optimal level of support for reading Japanese e-texts. The results of the survey showed that learners have their preferred e-dictionaries (in most cases, *e-word dictionaries* in which the user can look up individual words), and that few learners are aware of the existence of e-glossaries. The results of further study revealed that existing e-glossaries have various functions, but lack some requisite information crucial to the target language. This study suggests that technical issues revolving around the lack of spaces between words may be a reason for the lag in usage and efficacy of e-glossaries for languages without word boundaries.

Keywords: Electronic dictionary, Japanese, reading, vocabulary, function word, multiword unit.

1. Introduction

Fast-evolving technology has, in recent years, seen the emergence of abundant electronic dictionaries, and consequently, electronic dictionary users (Steel & Levy, 2013). Diverse types of computerised learning tools are available. Broadly speaking, computerised learning tools can be divided into lesson type (having a syllabus to follow) and dictionary type. The latter is usually referred to as electronic dictionary, or e-dictionary. While the use of the term 'electronic dictionary' is sometimes restricted to a portable battery-powered digital dictionary, in this article, the term is used to refer to a wide range of non-print form dictionaries. E-dictionaries come in several forms: online dictionary, portable battery-powered dictionary, dictionary app, and add-on/plugin dictionary. E-dictionaries can be divided into three forms (Pasfield-Neofitou, 2009), *word dictionaries*, in which users input a word and get a list of possible meanings (and other word-related information), *glossaries*, in which users paste a text and get glosses for individual words/phrases, and *translators*, in which users paste a text and get a translation of the whole text. In this article, they are called *e-word-dictionary*, *e-glossary*, and *e-translator* respectively. E-glossaries are more commonly known as reading support systems.

E-dictionaries are becoming an essential part of learning a foreign language. An electronic dictionary does not guarantee reading comprehension, as reading requires higher-level processing (e.g., syntactic and discourse analyses) as well as lower-level

processing (e.g., word identification and lexical meaning access) (e.g., Alderson, 2000; Koda, 1994). However, there is cumulative evidence suggesting that e-glossing facilitates lower-level processing and enhances vocabulary learning and authentic text reading (e.g., AbuSeileek, 2011; Lomicka, 1998). There are plentiful studies on electronic dictionaries for learning English, but those for learning Japanese are still scarce. There is a need for learning about the usage and efficacy of e-dictionaries for L2 learners of Japanese. The aims of the current study are (1) to investigate the use of e-dictionaries (particularly e-glossaries) by L2 learners of Japanese, and (2) to evaluate existing e-glossaries and identify areas for improvement.

2. Study 1: Use of e-dictionaries in L2 learners of Japanese

2.1. Background

There is a large number of studies on English learners' e-dictionary use, and the results suggest that paper dictionaries are losing popularity and that e-dictionaries are gaining importance among English learners (e.g. Sevik, 2014). The survey reported by Jin and Deifell (2013) showed that 87.5% of learners of foreign languages used e-dictionaries, and the percentage of e-dictionary users is expected to increase, given the rate of dictionary technology advancement. The use of e-dictionaries in L2 readers of Japanese is, however, under-investigated despite a growing number of Japanese-English bilingual e-dictionaries. According to Suzuki's survey (2012), which was conducted on 117 L2 Japanese learners from 42 different countries, showed that 71% of them used, frequently or relatively frequently, a portable electronic dictionary, 45% used an online dictionary, and 28%, a PC dictionary app (multiple choices were permitted). Not many learners were users of smartphone apps.

Due to increasing internet access, mobile device ownership and e-dictionary availability, the e-dictionary usage situation is ever-changing. In 2015, in order to investigate the change over the three years, a survey study was conducted to investigate the use of e-dictionaries among L2 learners of Japanese at the same university as Suzuki's study (2012).

2.2. Participants

Participants were students who were enrolled in intermediate and advanced Japanese courses for international and exchange students at the Japanese Language Center for International Students, Tokyo University of Foreign Studies, in the first semester in 2015. The students received survey forms in their reading comprehension classes, and were asked to complete them immediately following the class sessions. Participation was voluntary. 88 of 114 enrolled students submitted the survey forms.

After eliminating those with missing background information, the subject of analysis became the data of 82 students from 29 different countries (14 from China, 8 from Russia, 6 each from Italy and Korea, 4 each from US, Australia and Brazil, 3 each from England, Taiwan and Hong Kong, and 27 students from other countries). The levels of Japanese proficiencies (determined by class levels) were: 27 intermediate (two intermediate classes combined), 19 intermediate-advanced, 28 advanced (two advanced classes combined), and 8 near-native levels. Students in beginner classes were not invited to participate because the instructors in charge judged that the students rarely, if ever, used dictionaries for reading inside and/or outside classrooms as they were given difficulty-adjusted reading passages with full glossaries.

2.3. Procedure

A paper questionnaire regarding the use of e-dictionaries was circulated in 6 classes of reading comprehension modules in Japanese language courses. Students were asked to fill out the questionnaire during the class time. The first half of the survey concerns general use of dictionaries for studying Japanese, and students were asked to write down the names of up to three dictionaries that they use. The second half of the survey concerns the use of e-glossaries. An e-glossary type is an e-dictionary specifically designed for assisting learners by providing the information necessary for reading a text, such as segmentation of a text into meaningful units, and providing pronunciations, meanings, collocations, synonyms, and example sentences with the target items.

2.4. Results - Use of e-dictionaries

Out of the 82 students, 16 students did not name any dictionaries, and two students wrote the names of paper dictionaries, from which we can deduce that at least 64 students (78%) are e-dictionary users. There was a tendency for students from a particular country to favour particular dictionaries. There are no identifiable differences in the use of dictionaries between the students at the different proficiency levels, except the near-native level students, who use much fewer dictionaries than those from the other levels.

As 24 of the 64 students are users of multiple dictionaries, there are 88 counts of reporting of the use of an e-dictionary. 38 counts (i.e., 59% of the e-dictionary users) for online dictionaries (e.g., Jisho.org, Google translate, and Weblio), 38 (59%) for Smartphone apps (e.g., Imiwa, Naver, and JED), eight (13%) for battery-powered portable dictionaries, and four (6%) PC apps (including plugin apps). Apparently, online dictionaries and smartphone apps became the most used e-dictionaries in 2015, whereas portable dictionaries were popular in 2012 (See Table 1).

Type	2012 (Suzuki)	2015
Online	45%	59%
PC Apps	28%	6%
Smartphone Apps	20%	59%
Portable	71%	13%

Table 1. E-dictionary use.

Note: The percentages do not total 100% due to a number of multiple e-dictionary users.

The most used e-dictionary is *Imiwa* (Japanese multilingual dictionary for i-phone and i-pad) scoring 16 counts, followed by *Jisho.org* (online Japanese-English bilingual dictionary) scoring 13 counts. *Google Translate* (online translator), *Naver* (multilingual dictionary for Android), *Weblio* (online dictionary) scored eight, five and five respectively. There are 22 more e-dictionaries (including online dictionaries, plugin dictionaries and smartphone apps) mentioned. Some online dictionaries are used on more than one platform (e.g., desktop, laptop, tablet, phone).

Students use their dictionary/ies for various reasons. The most mentioned are 'convenient (easy) to use' and 'many and/or good examples', followed by 'can use anytime anywhere', 'fast' and 'extensive lexicons'. In addition, 'handwriting recognition', 'shows how to write *kanji* (adopted Chinese characters used in Japanese)', 'camera recognition', 'explanation in my language', 'including discipline-specific words', 'display in multiple languages', and 'works offline' are sometimes the reasons for using the particular e-dictionary. Other reasons include: 'free', 'can make a vocabulary list', 'good layout', 'shows word difficulty level', 'can learn both Japanese and English', 'can use on any site', 'no need to type in words', 'explanation in Japanese', 'reliable', 'has a word completion function', 'has intonation information', 'comprehensive', 'has a translation function', 'can input Japanese using alphabet', 'has collocation information', 'can use both on a computer and on a phone', and 'no advertisements'.

2.5. Results. Use of e-glossaries

To the question 'Have you used any system/application to assist reading Japanese e-texts?', only 17 (out of 82 students) responded 'Yes'. Eight students have used Rikai, five students, WWWJDIC, and four, Reading Tutor (No other e-glossary was mentioned). 49 out of 65 students who do not use an e-glossary provided a reason for not using; the main reason is that they do not know of such a system (26 students). 18 students think that such a system is not necessary (not doing out-of-class reading, being happy with their e-dictionaries or already having high level of reading ability).

Other reasons for not using include: not convenient, e-dictionaries are better, do not like reading, do not know what an e-glossary does, and no particular reason.

2.6. Discussion

Sevik's survey (2014) on English learners revealed that using e-dictionaries on mobile devices was the most favoured method of looking up unknowns. The current study indicated the same tendency in L2 readers of Japanese. In contrast to Suzuki's (2012) results, which showed the majority of learners using portable e-dictionaries, the current survey revealed that many students use online dictionaries and smartphone apps, although portable e-dictionaries have not disappeared.

Except for the clear strong preferences towards *Imiwa* and *jisho.org*, and the moderate preference towards *Google Translate*, students seem to be using a variety of e-dictionaries, most of which are e-word dictionaries. The reasons for using their dictionary/ies vary as well; user friendly (easy to use, fast, in learner's language) ubiquitous (anywhere anytime, can be used offline), and functions (extensive lexicons, good examples, facilities to recognise *kanji*).

The second half of the survey concerned the use of e-glossaries. An e-glossary can provide what an e-word dictionary can (i.e., provide information about individual words) and what it cannot (e.g., segment a text into meaningful units, and gloss a whole text). Despite this superior usability, the majority of students do not use an e-glossary due to a lack of information about this system. It is vital that learners and educators have a sound knowledge about e-glossaries, and make an informed decision on whether or not to use one. To this end, this study examines e-glossaries in terms of user-friendliness, ubiquity and functions, which are the main reasons mentioned for using the e-dictionaries.

3. Study 2: Evaluation of e-glossaries

3.1. Background

Before we examine what an e-glossary *can do*, we review the literature to see what it *should do* to support L2 readers.

3.1.1. User-friendliness

An e-glossary differs from an e-word dictionary in that it assists users to comprehend an e-text. Therefore, being able to capture a whole text and hyper-gloss individual words/phrases are essential. The format of the glossing can be in-text (embedded within a text) or pop-up (become visible only when clicked or a mouse hovered over). Chen and Yen (2013) compared three ways of display, in-text, pop-up and a separate list, and found that the pop-up format produced the best performance in L2 readers. On the other hand, the study conducted by AbuSeileek (2011) revealed that in-text glossing in the left or right margin had the best impact. In either case, however, a separate list (at the bottom) format did not produce a desirable effect. An e-glossary should give L2 readers glossing of words/phrases in the language that requires minimum cognitive load. Research findings suggest that, L2 learners prefer bilingual dictionaries (Sevik, 2014), and even when different types of glosses are made available for consultation, L2 learners tend to utilize primarily L1 definitions only (Lomicka, 1998), with an exception for highly advanced readers' preference to L2 definitions (Sevik, 2014).

3.1.2. Ubiquity

With the improvement of internet connectivity and mobile devices, not having an offline option may be a diminishing issue. What is an issue is that some online dictionaries only work on a large screen. Jin and Deifell (2013) reported that 93.4% of e-dictionary users used a laptop computer as the primary device, and 31.4% of them used other mobile devices (multiple choices were permitted). As smartphone and tablet owners increase, there will be an ever-increasing demand for e-glossaries that work on any platform (e.g., desktop, laptop, tablet, phone) whether offline or online, and however connected (e.g., cable, wifi or phone network).

3.1.3. Functions

The annotations should cover, ideally, all words/phrases in texts. Research suggests that, to successfully comprehend a text, L2 learners need to be able to recognise and decode 95-98% of the words in the text (Nation, 2001). An e-glossary assists in increasing intermediate and pre-advanced L2 learners' coverage of the text to the optimal level, and hence improving comprehension (Caleb & Matsumoto, 2011). Even if full comprehension may not be achieved by the use of an e-glossary in the case of beginner L2 learners, it will be helpful for vocabulary learning. An e-glossary therefore should have glossing for as many words/phrases as possible so that it will be ready for L2 readers.

As a Japanese sentence does not have a break between words (except some occasional commas), accurate and appropriate word segmentation on a system is critical in providing useful information about words/phrases. Chun (2001) reported that learners who used an e-word dictionary could not find many words in the dictionary due to their looking words up improperly, e.g., declined or conjugated forms rather than the base or root forms. An e-glossary is designed to solve this problem; it should identify any form and gloss it.

Not only *content* words (e.g., nouns, verbs, adjectives and adverbs), but *function* words (e.g., pronouns, particles, conjunctions, auxiliary verbs, components showing tense, aspect, voice and modality) need to be glossed. Knowledge of function words/phrases is a similar, if not identical, concept to that of grammar knowledge and syntactic knowledge. In the meta-analysis of components related to L2 reading comprehension, Jeon and Yamashita (2014) found that grammar and vocabulary are the two major contributors to comprehension. Grabe (2009) lists vocabulary and syntactic knowledge as the top two crucial components of L2 reading comprehension. Glossing function words is critical for syntactic comprehension, particularly in Japanese, in which tense, aspect, voice and modality are all shown in the form of bound (non-stand-alone) morphemes.

3.2. Evaluation of e-glossaries

3.2.1. Materials

In order to evaluate existing e-glossaries and identify areas for improvement, the three e-glossaries that have been named in the above e-dictionary survey are evaluated against the following criteria. The e-glossaries in question are: Rikai, WWWJDIC, and Reading Tutor.

3.2.2. Criteria

- User-friendliness – (a) Capture of a text, (b) Display of gloss, and (c) Languages of gloss
- Ubiquity – (a) Platforms and (b) Online/offline
- Functions – (a) Coverage, (b) Segmentation, (c) Content words, and (d) Function words

3.2.3 Procedure

Three unmodified Japanese text segments in different styles of writing (plain, polite, and colloquial styles), were chosen as test passages. These three passages were pasted into the three e-glossaries, and the results of processed passages were examined.

3.3. Results

3.3.1. User-friendliness

Rikai allows users to enter a web address or paste a text in the box provided. When the 'go' button is pressed, the results page is displayed. Glosses (definitions in English and pronunciations in Japanese) are shown in pop-up windows when the user moves the mouse over the text to see the definitions and pronunciations. WWWJIC is a multi-functional e-dictionary, one of the functions of which is an e-glossary. Users can enter a web address or paste a text into the provided box. The results (glosses) are shown below each sentence of the text. The default language is English, but users can change the system to display in other languages. Reading Tutor can be used as an e-word dictionary or an e-glossary (different pages). The e-glossary page lets users paste a text into the box, and when one of several languages is selected, it displays a scrollable

bar of glosses on the right hand side of the results page in the language (see Figures 1, 2 & 3, and Table 2).

Figure 1. The result pages of *Rikai.*

Figure 2. The results page of *WWWJDIC.*

Figure 3. The results page of *Reading Tutor.*

	Rikai	*WWWJDIC*	*Reading Tutor*
Capture of text	URL or paste	URL or paste	Paste
Display of glosses	Pop-up	Below sentences	Right margin
Language(s) of glosses	English (& 2 others in add-on/plugin versions)	English & Japanese & 9 others	English & Japanese & 4 others

Table 2. User-friendliness of e-glossaries.

3.3.2. Ubiquity

Rikai has add-on/plugin versions: Rickai-chan (for Firefox), Rikai-kun (for Chrome), Rikai-sam (modified version of Rikai-chan. Supports Windows, Ubuntu and newer versions of OSX). Rikai-sama has more features than the earlier versions. Strictly speaking, WWWJDIC does not have mobile device versions. However, there is WWWJDIC for Android created by another author, and the databases of WWWJDIC have been used in many other e-dictionaries, including Rikai. Reading Tutor does not have other versions (see Table 3). None of the above work offline.

	Rikai	*WWWJDIC*	*Reading Tutor*
Other form	add-on/plugin	None	None
Online or offline	Online	Online	Online

Table 3. Ubiquity of e-glossaries.

3.3.3. Functions

Coverage was evaluated using numbers and percentages of highlighted characters (indicating information is available). As the definition of a *word* is not well-defined in Japanese (Kato, 2006), characters rather than words were counted in order to determine the proportion of coverage. Firstly, for each passage, total characters per passage were counted, after deleting all punctuation. Secondly, the highlighted characters in each system were counted, and percentages were then calculated. The overall low coverage across the e-glossaries (see Table 4) appears to be due to insufficiently covering function words and post-verb bound morphemes showing tense, aspect, voice and modality.

	Total # of characters	*Rikai*	*WWWJDIC*	*Reading Tutor*
Passage 1	173	71 (41%)	136 (79%)	122 (71%)
Passage 2	245	120 (49%)	186 (76%)	152 (62%)
Passage 3	205	80 (39%)	148 (72%)	143 (70%)

Table 4. Numbers of characters and percentages of information provided.

Not all highlighted characters contribute to the provision of information. Several cases of over-segmentation of multi-word units (hereafter MWU) are observed in Reading Tutor and, to a lesser extent, in Rikai; for example, 馬の耳に念仏 [not heeding what others say] into 馬 [horse], 耳 [ears], and 念仏 [Buddhist prayer]. MWU refers to a combination of words that conveys a meaning on its own, including noun compounds, compound verbs, collocations, idioms, proverbs, fixed phrases and other lexical bundles. In WWWJDIC, this type of error is rare, as it provides the definitions of MWU as a

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whole. However, a few wrong segmentations of another sort are identified. For example, ということわざもある [there is a proverb saying …] should be segmented into という / ことわざ / も / ある. However, WWWJDIC mis-segments it, and provides information for ということ [such a thing], leaving わざ unglossed. This is because WWWJDIC uses a greedy algorithm (searching for a longest match in the dictionary). The coverage of accurate information, after removing mis-segmented parts, is shown in Table 5.

	Total # of characters	*Rikai*	*WWWJDIC*	*Reading Tutor*
Passage 1	173	62 (36%)	123 (71%)	110 (64%)
Passage 2	245	114 (47%)	186 (76%)	146 (60%)
Passage 3	205	74 (36%)	146 (71%)	108 (53%)

Table 5. Numbers of characters and percentages of accurate information provided.

The e-glossaries were then examined to determine whether information of content words and function words was provided. Rikai displays almost no function words. On the other hand, WWWJDIC has its strength in displaying functions words. Reading Tutor has abundant information for content words, but little information for function words (see Table 6).

	Information	*Rikai*	*WWWJDIC*	*Reading Tutor*
Passage 1	Content word	YES 25 types	YES 29 types	YES 35 types
	Function word	NO	YES 6 types	YES 3 types
Passage 2	Content word	YES 42 types	YES 34 types	YES 45 types
	Function word	NO	YES 8 types	YES 3 types
Passage 3	Content word	YES 27 types	YES 32 types	YES 40 types
	Function word	YES 1 types	YES 5 types	YES 3 types

Table 6. Information provided for content words and function words.

3.4. Discussion

In terms of user-friendliness, Rikai and WWWJDIC might be slightly more user-friendly than Reading Tutor because they allow users to paste web-addresses, and WWWJDIC can be more user-friendly than others if the learner's language is one of the many languages that this e-glossary covers. Their display formats are very different from each other, which may also affect user-friendliness. For ubiquity, all of them are for online use. However, since Rikai only shows essential information (no details), the small screen of a smartphone does not hinder users. On the other hand, WWWJDIC and Reading Tutor do not have that degree of compatibility (they are not made for smartphone use). This incompatibility might be a reason why only a handful of students use e-glossaries.

A reason for the overall low coverage in the e-glossaries seems to be that verb conjugations and post-verb bound morphemes are not adequately covered. For instance, none of the systems gives information about verb conjugations although WWWJDIC provides notes mentioning conjugation forms, such as "it is possibly the volitional form". Understanding conjugations accurately is crucial for reading comprehension (Shiotsu & Weir, 2007). As Japanese is an agglutinative language, meaning-determining information, such as tense, aspect, voice and mood, are all expressed in seemingly one single MWU, which carries critical information for comprehension. Provision of some explanation for the 'conjugation' MWU is required.

The results have revealed that segmentation errors can be caused by two distinct reasons: over-segmentation of MWU and identification of longest matches. Over-segmentation of MWU in Reading Tutor seems to be due to the morphological analyser being used. Most available Japanese morphological analysers use a small meaningful unit (i.e., a grammatical unit that carries semantic distinction) for the segmentation of a text, often conflicting with the size of the unit with which Japanese language learners are familiar (Yamauchi, 2008). On the other hand, WWWJDIC uses a greedy algorithm (searching for a longest match in the dictionary), and successfully finds MWU, provided they are in their dictionaries. A downside of using this algorithm is occasional inappropriate segmentations.

The results of the evaluation showed that e-glossaries gloss a number of content words, but glossing of function words is insufficient. In order to understand an unmodified text, information concerning function words is crucial. Jin & Deifell (2013) found, in their survey investigating the use and perception of online dictionaries across L2 learners of eight different languages, that Google (Google Search and Google Translate) and wordreference.com (both the dictionary and forum facilities) were the most frequently used sites. Their data revealed that the L2 readers preferred to use Google and wordreference.com forum in conjunction with other online dictionaries (which often only give content words) because they could look up the meanings of function words and MWU. If an e-glossary provides such information, learners do not need to consult multiple dictionaries.

4. Conclusion

The main aim for the current study is to investigate the usage and efficacy of e-dictionaries for Japanese, a language without boundaries between words. This article reported the results of two studies concerning e-dictionaries: a survey study investigating the use of e-dictionaries (particularly e-glossaries) by L2 Japanese learners, and a comparative study evaluating existing e-glossaries for Japanese.

The results on the use of e-dictionaries have clearly shown that using e-word dictionaries on various devices is becoming a trend. For reading an e-text, it is expected that the use of an e-glossary, which segments a text and glosses linguistic items, would be preferred over the use of an e-word dictionary. However, the results of the survey suggest that few L2 learners use an e-glossary, or even know of the existence of such. Whether the e-dictionaries that L2 learners use are the results of informed choices is questionable. Previous studies (e.g. Pasfield-Neofitou, 2009) and personal comments from some of the participants of the current survey suggest otherwise.

The second study was conducted to evaluate e-glossaries, their features and characteristics, to determine the reasons for their low usage. Although the generalisation of the current results has limitations due to the study's small sample size, it was found that the restricted platforms on which e-glossaries can run may be a reason for limited adoption. The results also suggest that e-glossaries have various functions, but lack some requisite functions, such as accurate segmentation and showing function words and MWU.

Due to increased internet connectivity and platforms, the survey study showed a dramatic increase of users of online dictionaries and smartphone apps, compared to three years ago. However, most available e-dictionaries are e-word dictionaries, in which the user can look up individual words. In other words, L2 learners need to be able to identify words (i.e., boundaries of words), appropriately segment function words and MWU (including components showing tense, aspect, voice and modality) and change them into their root forms in order to look up properly in an e-word dictionary. However, at present, the ubiquity of e-word dictionaries is preferred over the informativeness of e-glossaries. The evaluation of e-glossaries revealed that there is still room for improvement; it was discussed that an e-glossary would benefit by the provision of information for those linguistic components crucial to the target language. This study suggests that technical issues revolving around the lack of spaces between words may be a reason for the lag in usage and efficacy of e-glossaries for languages without word boundaries.

It has been reported that educators consider dictionary use to be something learners do on their own on their own responsibility (e.g., Liou, 2000), and with a marked increase of e-dictionary availability, it is becoming ever harder for educators to grasp the whole picture. For this reason, studies concerning usage and efficacy of e-dictionaries, such as this one, are valuable. For learners and educators to make judgements about e-dictionaries, their evaluation is as necessary and as beneficial as the effects of their use by learners.

Acknowledgements

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E-glossaries analysed:

- Reading Tutor http://language.tiu.ac.jp
- Rikai http://www.rikai.com/perl/Home.pl
- WWWJDIC http://www.edrdg.org/cgi-bin/wwwjdic/wwwjdic?1C

Research paper

A study of Chinese engineering students' communication strategies in a mobile-assisted professional development course

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Abstract

The development of students' professional skills is an important issue in higher education in China. This research reports a 3-month study investigating engineering students' communication strategies (CSs) while they were interacting to do a 12-week mobile-assisted learning project, i.e., "Organizing and Attending a Model International Conference". This learning project was a major teaching module of the English course of Professional Applications, which used a blended teaching mode integrating face-to-face instruction and mobile learning. Sixty-seven students volunteered to participate in the study. The instruments included eight oral communication sessions, a questionnaire, stimulated recall interviews, the participants' WeChat exchanges, etc. Results showed that the participants used a variety of CSs when completing the academic learning project. Moreover, these CSs were closely related to the students' involvement in social interaction. Future research should focus on a longitudinal investigation of the amount of scaffolding that helps students transfer their communication strategies across tasks.

Keywords: English education, communication strategies, mobile-assisted language learning, academic performance.

1. Introduction

1.1. Background

The development of communication skills including interpersonal skills, management skills and teambuilding skills in undergraduate students has been a major concern in higher education in China. University students' ability to communicate effectively in print, in presentations, and in electronic media plays an important role in their success in the chosen profession.

According to *The National Outline for Medium and Long-term Education Reform and Development (2010-2020)* students are the center of education with competence building and well-rounded development being given the top priority. Guided by the above-mentioned policy released by the Ministry of Education in China, many universities in China have now used technologically supported English learning systems.

A computer-assisted language learning (CALL) system may be as large as a university-wide system or as small as a unit or individual in a classroom. Many CALL researchers and teaching practitioners have claimed that learners in a class with Internet enabled CALL have better opportunities for learning than those in the traditional approach of face-to-face instruction (e.g. Beatty, 2003; Blake, 2000; Blin, 2004; Jones, 2001; Smith, 2003). In support of this claim, Stockwell (2007) and many other researchers posit that there exists a complex interplay of language, culture and technology in language learning. Two decades ago, CALL researchers started to investigate the effects of mobile-assisted language learning (MALL) and found more MALL potentials because

of the flexibility offered to learners in and outside of the classroom (Godwin-Jones, 2011).

According to a survey by the China Internet Network Information Centre, in 2014, students using mobile phones accounted for 23.8% of the total netizens in China. Drawing on the recent research and practice in MALL, this paper reports a study investigating the communication strategies (CSs) used by a group of engineering students while they were interacting to complete academic tasks in an English course which used a blended mode of face-to-face instruction and mobile learning.

1.2. Theoretical framework

Linguistic Interdependence Theory (Cummins, 1979, 1991; Cummins & Swain, 1986) served as the theoretical framework for this study. The key concept of the Linguistic Interdependence Theory (LIT) is "transfer". In other words, there exists an underlying proficiency base which allows the transfer of literacy-based skills across languages.

In order to be able to explain the actual process of transfer, Cummins (1980, 1984) proposes two constructs of language proficiency: basic interpersonal communicative skills (BICS) and cognitive/academic language proficiency (CALP). BICS are a set of skills related to daily conversational skills in context-embedded situations in which direct contextual support is provided for producing or interpreting meaning. CALP refers to general context-reduced cognitive or academic skills such as linguistic skills, problem-solving skills, and literacy skills. Unlike BICS, CALP is more cognitively demanding and deals with the academic aspects of language usage including academic writing and speaking. According to Cummins and his colleagues, the underlying proficiency base allows BICS and CALP to transfer across languages and across modalities. Cummins' Linguistic Interdependence Theory has played an important role in second language education.

1.3. Literature review

The notion of communication strategy (CS) in a second language (L2) was first raised by Selinker (1972) when he identified the processes of interlanguage development. This has led to a series of systematic analyses of the definitions, descriptions and taxonomies of CSs as well as practical implications of CS research (e.g., Bialystock, 1990; Dörnyei & Scott, 1997; Faerch & Kasper, 1983; Kasper & Kellerman, 1997; Taron, 1980; Varadi, 1980). In this study, CSs are regarded as problem-solving devices. According to Dörnyei and Scott (1997), CSs are strategic language behaviours to handle three types of communication problems: (1) Own-performance problems (i.e., one realizes that what he/she has said is incorrect or only partly correct), (2) Other-performance problems (i.e., one finds something problematic in what has been said to him/her), and (3) Processing-time pressure (i.e., one needs more time to plan and process L2 speech). In this view, CSs, like other strategic devices, are regarded as conscious, deliberate, goal-oriented, planned, flexible, and self-regulatory.

In the past 10 years, the empirical and conceptual analyses of CSs have been expanded from the early investigation in the psycholinguistic field to the current sociolinguistic enquiry and now include the roles of institutional setting and the socio-political context in CS use. However, literature to date has mainly focused on the identification of L2 learners' CSs and the effectiveness of strategy training (e.g. Lafford, 2004; Lam, 2006; Omar, Embi & Yunus, 2012; Smith, 2003). Little has been done on how Chinese learners of English use CSs in mobile learning contexts.

The purpose of this study is to investigate the relationship between the acquisition of academic literacy and communication strategies in a mobile-assisted learning program. It is hoped that the analysis of students' involvement in their academic communication of this MALL program will bring new insights into English education in China.

The following were the research questions in the study:

1. What CSs do Chinese learners use when they do academic tasks?
2. To what extent do communication contexts (classroom settings and mobile learning settings) affect L2 learners' CSs use?

2. Method

2.1. Site and participants

The study was conducted in a double-degree Joint Program between a Chinese university and a university in the UK. The teaching objective of the Joint Program was to help students to develop professional competence integrating knowledge, skills and values.

This program was designed to meet the specific needs of engineering students, i.e., using English to learn disciplinary content (see Figure 1).

Figure 1. Integration of language, knowledge and skills in the course of Professional Applications.

Being one of the core courses of professional development in this program, "Professional Applications" (PA) was offered to all the Year-2 students. PA was guided by the pedagogical theory of Task-Based Instruction (Nunan, 2004). In this course, professional knowledge and technical skills were introduced and practiced. Students were expected to do various kinds of the tasks/projects including a 12-week learning project of "Organizing and Attending a Model International Conference (MIC)" which consisted of three subtasks: two individual tasks of "Conference Paper Writing" and "Academic Presentation" and one team task of "Organizing a 1-day Conference". The team task of "Organizing a 1-day Conference" was an important annual event held in the school and attended by all the Year-2 students, the instructors and five to six invited speakers in the field of telecommunications. The teaching contents of related professional knowledge and skills were arranged accordingly with two hours' face-to face instruction every week supplemented by group discussions using WeChat, one of the most popular social networking tools in China.

The study under discussion took place in the course of PA and covered a period of 3 months from March to May of 2016. "Organizing and Attending a Conference" was the focus of the study. The researcher was also the instructor of PA. Sixty-seven students volunteered to participate in this 3-month study. Among them, 35 were majoring in Telecommunications Engineering with Management and 32 in Internet of Things Engineering. All the participants had passed the national examination of College English Band 4, thus indicating they had an intermediate level of English.

2.2. Procedures

Four types of data were collected to identify CS use by the participants: (1) eight in-class oral communication activities (including group discussion and presentations), followed by 10 stimulated recall group interviews, (2) a 40-item questionnaire based on Dörnyei & Scott's (1997) Inventory of Strategic Language Devices, (3) the participants'

WeChat exchanges while they were discussing their coursework, and (4) the participants' reflective reports and assignments. The stimulated recall group interviews, each lasting for about 30 minutes, were conducted in Chinese to avoid unnecessary communication difficulties. At the end of May, the participants were asked to respond to the questionnaire on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach's alpha of the questionnaire was 0.778, indicating it was reliable. All the data were then transcribed and coded by the researcher and her research team. The transcription conventions were adopted from Duff (2000).

3. Results and discussion

In this study, we used both quantitative and qualitative analysis to gain more insight into the dynamics of communication strategies in a MALL setting. A total of 8-hour communication sessions and 5-hour interviews were recorded. The WeChat messages consisted of 18,241 words, 192 voice messages and 597 emoticons/pictures/videos. Based on Dörnyei & Scott's (1997) Inventory of Strategic Language Devices, the transcripts of eight oral communication sessions were analyzed and 16 CSs identified (See Table 1).

	Types of CSs	Description	Examples of discourse markers	Frequency
1	Message abandonment	Leaving a message unfinished because of some language difficulty	"MIC? Ur…It's a meeting?… ## Okay". (With puzzled facial expression and frowns)	336
2	Message replacement	Substituting the original message with a new one because of not feeling capable of executing it.	(Retrospective comments in the stimulated recall interview. When talking about conference organization) "*I'm the char. I forgot how to say chengxuce ((conference program)). So I had to say something else*". (Translated by the researchers)	245
3	Circumlocution (paraphrase)	Exemplifying, illustrating or describing the properties of the target object or action.	"Dress code means you should wear shirts and suits…## like this." (showing a picture of their fellow students working as volunteers at Global Mobile Internet Conference 2015)	424
4	Approximation	Using a single alternative lexical item, such as superordinate or a related term, which shares semantic features with the target word or structure.	Use of "composition" or "essay" instead of "conference paper"	245
5	Use of all-purpose words	Extending a general, "empty" lexical item to contexts where specific words are lacking.	"the thing", "something like that", "bla, bla, bla"	198
6	Word coinage	Creating a non-existing L2 word by applying a supposed L2 rule to an existing L2 word.	"unsastified", "unlegal"	88
7	Literal translation (transfer)	Translating literally…from L1/L3 to L2.	"After I entered into this university…" Use of "meat eyes" to refer "naked eyes"	398
8	Foreignizing	Using an L1/L3 word by adjusting it to L2 phonology.	"That's all simida" (Use of the Korean word simida for stress.) "nani" (Japanese word for "what". Used to express curiosity or anger in many Chinese contexts.)	88

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9	Code-switching	Including L1/L3 words with L1/L3 pronunciation in L2 speech.	"G si" and "G wu" ((Chinese equivalent for G4 and G5)) "moni guoji huiyi" (Model International Conference)	436
10	Repair	Making corrections in one's own speech or other's performance	"Ladies and gentlemen. You're warmly welcomed...welcome."	195
11	Mime (non-linguistic / paralinguistic strategies)	Describing whole concepts nonverbally, or accompanying a verbal with a visual illustration.	Speaker 1: "Look, this part of presentation skills, nonverbal communication. (The speaker demonstrates using eye contacts and hand gestures.)...Is it clear?" Speaker 2: (Nods and smiles)	289
12	Use of fillers	Using gambits to fill pauses ... in order to keep the communication channel open and maintain discourse at times of difficulty.	" Well, you know, ...(laughing) ..."	165
13	Repetition	Repeating a word or a string of words immediately after they were said.	Speaker 1: "One of the writing mistakes is redundancy..." Speaker 2: "Redundancy"? Speaker 1: "Yes, redundancy."	210
14	Appeal for help	Trying to elicit help from others directly or indirectly	(Turns to the group leader) "Can you email me the IEEE paper template?"	321
15	Asking for clarification	Requesting for more explanation.	"What do you mean?"	254
16	Expressing non-understanding	Expressing that one did not understand	"I'm sorry. I don't understand."	132

Table 1. Description of CS use in the communication sessions.

As can be seen from Table 1, the participants used 16 types of CSs in their oral communication sessions. Moreover, results show high occurrences of "Code-switching" (F=436), "Circumlocution" (F=424) and "Literal Translation" (F=398).

The WeChat data showed similar types of CSs used by the participants except for Strategy 11 of "Miming". Because of the absence of face-to-face communication in WeChat interactions, the participants tended to use more frequently the compensatory strategy of mobile-supported emoticons, voice messages, etc. Table 2 presents the mean and standard deviations of overall CS use reported in the questionnaire data.

CS Item #	Range	Minimum	Maximum	Mean	SD
1	1.92	2.69	4.61	3.55	0.8
2	2.96	2.02	4.98	3.51	1.01
3	1.99	3.01	5	3.81	0.98
4	2	2.86	4.86	3.76	0.89
5	1.13	1.88	3.01	2.48	1.01
6	0.9	2.96	3.86	3.01	0.79

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7	2.01	2.98	4.99	3.96	1
8	3.02	1.91	4.93	3.03	0.84
9	0.55	4.45	5	4.71	0.99
10	1.6	3.28	4.88	4.11	0.78
11	2	2.97	4.97	3.57	0.89
12	0.05	3.76	3.81	3.78	1
13	1.7	3.3	5	4.05	0.89
14	1.89	3.04	4.93	3.65	0.79
15	1.14	3.86	5	4.39	0.98
16	0.68	3.13	3.81	3.27	0.88

Table 2. Descriptive statistics of the CS use reported in the questionnaire.

The results indicated that the participants reported using the same types of CSs. However, they used different CSs when performing different tasks. A closer look at the further context of CSs, i.e., two or more turns preceding/following the turn(s) containing the discourse makers of CS usage revealed that the participants used those CSs not only for comprehension purposes (to overcome communication gaps) but also for interpersonal communication purposes. Data from the WeChat exchanges provided supporting evidences for the equally important roles of negotiating for meaning and communicating to maintain a friendly and supportive relationship. The following extract is a WeChat example of using the CSs of "Code-switching" and "Mime/paralinguisitic strategies":

1. Jigang (the group leader): *Dajiahao* (*Hi, everyone*)! We have reviewed all the papers. We'll soon announce the names of the authors who will present at the MIC.
2. Lily: Present at MIC?
3. Jigang: Yes, present at moni guiji huiyi (*Model International Conference)* simida.
4. Lily: Haosailei! (The word haosailei means "great" and has the pronunciation in Cantonese dialect. It is a popular Internet buzzword in China.)
5. Jigang: (follows Lily's message and posts a yellow smiley)
6. Jason: (follows with a thumbs-up emoticon)

Extract 1 from WeChat Group 1 (2016-04-18)
(Jigang, Lily and Jason are pseudonyms of the participants.)

In the above situation, the first communicator Jigang makes an announcement in the Class WeChat Group. The phrase of "Present at MIC" is repeated in the second turn. It is a signal for a problem in understanding the term MIC. Jigang interprets this as a request asking for clarification. So in the third turn, he rephrases the term using the Chinese equivalent "moni guoji huiyi". In the fourth turn, Lily shows understanding and appreciation by using a Chinese buzzword "haosailei". Other students join in the chat by adding more emoticons. In recent years, many foreign cultures and languages have been introduced into China. That might explain why some foreign words such as the Korean word "simida" (expressing stress) and the Japanese word of "nani" (expressing anger or curiosity) were frequently used in the participants' oral communication and in their WeChat exchanges.

It should be noted that although similar CSs were identified in two learning environments: oral sessions in typical classroom contexts and after-class group discussion through WeChat, data showed that there are some differences in strategy use between the two types of interaction. Due to the absence of face-to-face interaction

in WeChat, avatars and WeChat IDs were used for user identification and text messages were supplemented/replaced by emoticons, graphics, voice messages, short videos or hyperlinks. This was supported by the comments from the stimulated recall interviews and from the participants' reports.

To sum up, data analysis shows that the participants used a variety of L1-, L2 and even L3-based CSs to overcome communication gaps. However, they used different CSs in different situations and for different purposes. Some students paid more attention to getting their meaning across while other focused more on maintaining a supportive and friendly relationship.

4. Conclusions

In this paper, the researcher has attempted to answer two research questions by analyzing the data from a socio-cognitive perspective. Three conclusions can be drawn from the above discussion. First, the L2 learners used a variety of L1-, L2-, L3-based CSs when completing academic tasks related to conference communication, thus providing supporting evidences for the theory of Linguistic Interdependence. Second, they had the same repertoire of strategies to deal with various kinds of communication problems and to meet various kinds of task needs in both classroom settings and mobile-learning settings. Finally, they employed different strategies when doing different tasks and in different communication settings. The pedagogical implication of the study is that instructors should have CS training tailored to their students' professional needs. It is suggested that the direction for future research focuses on a longitudinal investigation of the amount of scaffolding that helps students transfer communication strategies across tasks.

Acknowledgements

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Review paper

A review of mobile language learning applications: trends, challenges and opportunities

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Abstract

Mobile language learning applications have the potential to transform the way languages are learned. This study examined the fifty most popular commercially-available language learning applications for mobile phones and evaluated them according to a wide range of criteria. Three major trends were found: first, apps tend to teach vocabulary in isolated units rather than in relevant contexts; second, apps minimally adapt to suit the skill sets of individual learners; and third, apps rarely offer explanatory corrective feedback to learners. Despite a pedagogical shift toward more communicative approaches to language learning, these apps are behaviorist in nature. To better align with Second Language Acquisition (SLA) and L2 pedagogical research, we recommend the incorporation of more contextualized language, adaptive technology, and explanatory feedback in these applications.

Keywords: Mobile-Assisted Language Learning (MALL), Communicative Language Teaching (CLT), adaptive learning, vocabulary instruction, grammar instruction, corrective feedback, assessment.

1. Introduction

A remarkable number of people are turning to their mobile devices to learn a foreign language. The global market for digital English language learning products, for example, reached $1.8 billion in 2013. Revenues are projected to surge to over $3.1 billion by 2018, with a compound annual growth rate (CAGR) over a five-year period of 11.1% (Adkins, 2008). Language learning apps like *DuoLingo* are immensely popular, with over 70 million sign-ups (Hickey, 2015). Mobile language learning approaches are clearly in demand and will continue to grow in use as more people turn to smartphones or tablets as a primary computing device.

The rise of mobile app usage for language learning raises an important question: are current commercial mobile language learning apps *effective* tools for language learners, based upon what we know about research in L2 pedagogy, pedagogical design, and Second Language Acquisition (SLA) research? And further, given this information, how can the state of commercial applications inform academic research and vice versa? While the pedagogical uses and new opportunities of mobile technology for language learning have been studied in academic contexts, existing commercial mobile language learning apps have not been systematically evaluated and characterized.

In this paper, we conduct and provide a comprehensive and systematic review of the fifty most popular language learning apps available for iOS and Android phones as of Spring 2015. This sampling provides a broad characterization of the state of apps that are being used for mobile language learning. An analytical protocol was developed to

investigate the following questions regarding areas of instruction, assessment, and feedback. Specifically, we investigated:

- What are the primary pedagogical focuses of popular language learning apps?
- Do apps adapt to individual needs, language proficiency levels, and styles of learning?
- How is corrective feedback employed in these apps?

Before attempting to answer these questions, we begin with a brief review of existing literature and our theoretical framework. We then describe our methodology for sampling and analytical coding. Finally, we present our results with a discussion of major trends and our recommendations for the field.

2. Literature review

Research in MALL has largely been mediated by technological development. Early applications made use of portable audio devices such as the Sony Walkman or Apple iPod (Godwin-Jones, 2011). Early internet-capable devices such as cell-phones and personal digital assistants (PDAs) made basic use of email and web browsing for language learning (Chinnery, 2006). Pedagogical approaches were fairly limited on these devices, constraining most applications to one-way content delivery with little peer-to-peer communication or interaction (Kukulska-Hulme & Shield, 2007; Kukulska-Hulme & Shield, 2008).

Published MALL studies increased dramatically in 2008 (Duman, Orhon, & Gedik, 2015). Coinciding with the emergence of smartphone technology, applications began to make greater use of web-based activities (e.g. Nah, White, Rol, & Sussux, 2008; Stockwell, 2008). Since then, mobile technology has grown in sophistication, resulting in the release of a large amount of language-learning software. There are over a million apps available to users in both the Google Play and Apple iTunes app stores; educational apps comprise 9.95% of this total (Statista Inc., 2015). The number of language learning apps has been estimated to be as high as 1,000 to 2,000 in total (Sweeney & Moore, 2012).

Despite rapid growth in app numbers, MALL research has been criticized for a lack of objective, quantifiable learning outcomes. Burston (2015) conducted a meta-analysis of 291 MALL studies spanning 20 years, and found only 35 were of sufficient duration (1 month) and involved a minimal number of subjects –ten. Burston also noted that many of the studies were afflicted by inadequate research design due to failure to address confounding variables that exist outside of the device itself –novelty effects, content, the instructor, etc.– perhaps due to an overly "technocentric" approach that overemphasizes the role technology plays in learning.

Shortcomings aside, the positive reports of many of these MALL studies support the notion that mobile devices are efficacious learning tools - in particular for vocabulary instruction. In Duman, Orhon and Gedik's (2015) literature review of research trends in MALL from 69 studies from 2000-2015, "teaching vocabulary" was the most popular topic, addressed by 28 of those studies; conversely, only one study examined grammar instruction and writing. Likewise, Burston (2015) noted that 58% of the 291 MALL studies examined were concerned with vocabulary acquisition, most of which reported positive learning outcomes (2015, p. 12). Burston also noted positive reports for vocabulary learning, reading competency, listening, and speaking skills across the studies.

An important concept that has emerged recently is the notion of *adaptive learning*, which uses computers as personalized teaching devices. Adaptive learning proposes a softer version of the artificial intelligence driven systems proposed by early research in Computer Assisted Language Learning (ICALL), developments that would heavily rely on improved natural language processing, and the computer's ability to extrapolate meaning from speech (Warschauer & Healy, 1998). Kerr (2013) predicts a move away from traditional textbooks and towards interactive adaptive learning platforms (p. 18), with both an incorporation of more gamified elements and the use of big data and analytics to store content about users.

3. Theoretical framework

In making sense of what types of instructional design are most effective, the contributions of SLA and pedagogical research are indispensable. As Kukulska-Hume and Bull (2009) observe, "There is a large body of research on many aspects of second language learning, but often much of the relevant theory and empirical findings are overlooked by developers of language learning technology support" (p. 1). Reinders and Pegrum's (2016) framework for evaluating mobile apps notes the importance of discussing findings of both SLA and pedagogy when evaluating applications. SLA has core requirements: "the need for comprehensible input, comprehensible output, negotiation of meaning in interaction, and noticing of new language, the last of which can be promoted through effective feedback" (p. 6). Without these rudimentary components, it is challenging for learners to truly gain communicative competence in the target language.

Theoretical models of language knowledge (e.g. Canale and Swain, 1980; Bachman and Palmer, 1996; Purpura, 2004) tease apart the differing components into a number of categories, such as grammatical knowledge, pragmatic knowledge, discourse knowledge, functional knowledge, and sociolinguistic knowledge, among others. To gain communicative competence in a language, one must develop a multifaceted range of knowledge; simply knowing words is insufficient. Pedagogical approaches to app development ought also to take this into consideration when determining what content to include, and how to assess learners, especially if the intention is to teach learners language and not just to teach learners words.

Classical methodologies for classroom language teaching, such as the grammar translation method popular in the 1950s, have been characterized as *behaviorist* in nature, as they call upon skills such as memorization, drilling practice, and repetition (Brown, 2007). The behaviorist model posits that learning occurs as a result of stimulus-response associations, which build in learners a repository of knowledge that can be strengthened or weakened based on the frequency of reinforcement or inattention (Fosnot & Perry, 1996). Language knowledge is objectively attainable, and exists outside of the learner; the role of the teacher is to help to develop and strengthen associations to words and grammatical rules. Though behaviorism has seen a resurgence in popularity and is certainly not without its merits, especially in language learning, it may be, on its own, insufficient to characterize how language is learned. "Missing from this perspective […] is any treatment of the underlying structures or representations of mental events and processes and the richness of thought and language" (Pellegrino, Chudowsky, & Glaser, 2001, p. 62). Behaviorism misses the social element, the notion that language use is a fundamentally communicative act.

In contrast to behaviorism, a *constructivist* theory of learning, often attributed to thinkers including John Dewey, Lev Vygotsky and Jean Piaget, rejects the idea that "human knowledge is a direct reflection of an objective reality" (Blyth, 2007, p. 3). In other words, constructivism is rooted in an epistemological framework that denies the existence of a singular, objective truth that can somehow be transmitted from teacher to student. Knowledge is acquired by processes that blend the learner's pre-existing knowledge framework, acquired through years of development and experience, with that encountered in social contexts; "The individual learns by being part of the surrounding community and the world as a whole" (Oxford, 1997, p. 445). As such, learning a language is viewed as a social activity.

This study emphasizes the notion that language is a tool for communication with instrumental rather than ends-based value. Simply knowing words and structures does not itself enable a learner; rather, it is one's ability to *use* them meaningfully that makes them valuable. This idea, often referred to as the learner's *communicative competence* (Hymes, 1972), can be thought of "in terms of the expression, interpretation, and negotiation of meaning" (Sauvignon, 2002, p. 1) rather than mastery of words and forms. Or as Ur (2013) states, it requires a focus on "use" and not only "usage" (p. 2). This important distinction guides much of our analysis and discussion.

With this in mind, we consider what values are embodied by the apps that are easily accessible on mobile phones. There are many ways to learn a language, and varying degrees and definitions of what it means to be "proficient." Many language learners find that a combination of drilling and communicative practice lead to communicative competence. Other learners may not intend to be fluent in a language, but perhaps only intend to learn some vocabulary. Our aim is to characterize apps currently available and to make recommendations that may help guide their future development.

4. Methodology

4.1. Research design

This study examined fifty of the top commercial apps for Apple iOS and Google Android mobile phones, employing an *exploratory-qualitative-interpretive* approach (Grohtjahn, 1987). According to this approach, apps were selected and coded according to a grounded set of criteria, and data were analyzed to determine the most relevant trends and characteristics.

4.2. Selection of apps

Fifty apps were selected on the basis of their rankings on Google Play and in the Apple iTunes App Store by searching for the key phrase "language learning". App rankings were used for selection as they represent a metric for the most popular apps a typical user might find upon searching for "language learning." While the exact algorithms used by Google and Apple to calculate these rankings are not disclosed to the public, they are roughly based on the total number of downloads, reviews, and income earned from sales (Edwards, 2014).

The app analytics engine App Annie (App Annie, 2015) was used to identify and compile a list of the top 50 apps in both stores as of March 2015. App Annie, though not directly affiliated with Apple or Google, collects information from users and uses it to estimate rankings of apps. Apps holding multiple rankings for different languages were considered as a single app and were only included once. Some apps were excluded due to irrelevance to the research questions, such as those that teach computer programming languages or those that focused solely on translation. A full list of apps included in this survey may be found in *Appendix A*.

4.3. Instrument design and coding

The survey instrument was carefully constructed during initial testing in order to answer our primary research questions. Questions on the survey were designed to capture a broad range of aspects. Topics covered included: languages taught, operating system, monetization, areas of assessment, modes of grammar instruction, corrective feedback, and types of input and output to the device. The final instrument resulted in 24 questions covering 149 subcriteria using selected-response checkboxes.

It is important to note that subcriteria were not typically mutually exclusive, allowing for multiple selection of subcriteria under a particular question. For example, a single app may be coded for both implicit and explicit grammar instruction, if it contains features of both. However, when an app is coded for "None" as a subfeature, it was not coded for any additional features.

An overview of the questions and subcriteria are presented in Table 1. The survey instrument is presented in *Appendix B*.

4.4. Data collection and reliability

Prior to data collection, a norming session was held to ensure coders were selecting criteria in a similar fashion. Four coders in total examined the apps. During the process of data collection, the coders met on a weekly basis to discuss any issues related to coding. Eleven apps were randomly selected for coding by two raters, providing a sample for reliability analysis. Cohen's Kappa was calculated and questions with low reliability ($\kappa < .60$) were not included for analysis. For the questions presented here, Kappa ranged from $\kappa = .629$ ($p < .015$) to $\kappa = 1$ ($p < .0005$) with an average of $\kappa = 86.5$.

Question Topic	Subcriteria & Explanation
Languages	Languages supported by the app were manually entered by the coders.
Platforms	Possible platforms: Android, iOS, Windows Phone, Blackberry
Monetization	**None** - No apparent monetization scheme **Pay to Unlock** - User pays a flat fee to access languages or levels **Subscription** - User pays a recurring fee to access content **In-App Advertisements** - Advertisements placed throughout the app
User Input to Device	**Touch Gestures** - User touches the device to provide input **Writing on Keyboard -** User writes on the device keyboard **Speaking into Microphone** - User speaks into the microphone on the device
Areas of Instructional Assessment	The areas of instruction were examined based upon areas of language ability that were *assessed* by the application. Thus, the user would need to be tested on their ability to use the following features when interacting with the application. **Vocabulary in Isolation** - User ability to select, write, or speak individual words without placing them into the context of other words **Vocabulary in Context -** User ability to select, write, or speak words or sentences that have been placed into the context of other words **Grammatical Form** - User demonstrates knowledge of morphosyntactic form and/or sentence structure in clauses **Pragmatics** - User demonstrates understanding of situational use of certain expressions over others **Pronunciation** - User demonstrates ability to appropriately pronounce words **No Assessment** - No explicit measures taken to assess learner input to device
Modes of Grammar Instruction	**Implicit -** User must deduce understanding of grammatical forms. No explicit coverage of grammar or metalinguistic terminology included **Explicit - Grammar Presentation -** Grammar explicitly referenced by the app in the form of explanations about grammatical features prior to assessment **Explicit - Grammar Feedback -** Grammar explicitly referenced in feedback provided to learners during interaction **None -** Grammar addressed neither explicitly nor implicitly; apps teach words in isolation, therefore do not address grammar
Corrective Feedback	**Sound Effects -** A sound indicates correctness of answer **Visual Feedback -** A visual stimulus indicates correctness of answer **Textual Corrections -** A short textual correction is provided when an answer is incorrect **Textual Explanations -** A textual explanation indicating rationale for correctness of answer is provided **None -** No feedback is provided on correctness of answer
Listening, Reading, & Writing	Output and input in the form of letters and text, as read, written (either by selecting or typing on the keyboard), or heard by the user. Textual input and output were categorized according to length and type: **Letters -** Individual letters **Words** - Individual words and phrases not in sentences **Sentences** - Complete sentences **Passages** - Any text a paragraph or longer **Dialogues** - A conversation between two or more speakers **Songs** - Any text set to music

Table 1. Overview of question topics and subcriteria assessed with survey instrument.

5. Results

Below we highlight findings which provide an overview of currently available language-learning apps and address our three primary research questions.

5.1. Languages supported

Most of the selected apps taught multiple languages. The top ten languages taught were English (36 of 50 apps, 72%), French (36 of 50 apps, 72%), Spanish (34 of 50 apps,

68%), German (33 of 50 apps, 66%), Chinese (28 of 50 apps, 56%), Italian (27 of 50 apps, 54%), Japanese (25 of 50 apps, 50%), Portuguese (21 of 50 apps, 42%), Russian (21 of 50 apps, 42%), and Arabic (19 of 50 apps, 38%). Twelve of the selected apps taught only a single language; one app taught a maximum of 200; the mean number of languages taught per app was 15.1.

5.2. Platforms supported

While 25 of the apps selected were from the Apple Store (for iOS) and 25 were from the Google Play store (for Android), some of these apps were compatible with multiple platforms. Many Android apps were also available for iOS and vice versa. The total percentages were: iOS (40 of 50 apps, 81%), Android (34 of 50 apps, 69%), Windows Phone (5 of 50 apps, 8%), and Blackberry (2 of 50 apps, 3%).

5.3. Monetization

The majority of apps (29 of 50 apps, 64%) included a "pay to unlock" feature requiring users to pay a flat fee to access additional levels or languages. Other forms of monetization included a subscription payment system (7 of 15 apps, 15%) and in-app advertisements (11 of 50 apps, 23%). Only a minority of apps (6 of 50 apps, 14%) had no apparent monetization scheme.

5.4. User input

While all apps used touch gestures, 16 of 50 (32%) included writing words using an onscreen keyboard and 12 of 50 (24%) allowed the user to speak into the device using the microphone.

5.5. Assessment and instructional focus

Our first research question asks about the focus of instruction in individual apps. In order to determine intended instructional focus, we examined which language areas were being assessed by each app. Our rationale is that assessment reveals which aspects of language are being taught and emphasized (Figure 1). We looked at a variety of models of L2 communicative language ability (Canale and Swain, 1980; Bachman and Palmer, 1996; Purpura, 2004), and found that areas assessed could be divided into vocabulary instruction (whether isolated or in context), grammatical form, pragmatics, and pronunciation.

The majority of apps (42 of 50, 84%) included a focus on vocabulary items as isolated units, that is, as individual words without context. Just over half of the apps (23 of 50, 53%) assessed vocabulary in context. Other apps focused on grammatical form, pragmatics, and pronunciation. 5 of 50 apps (10%) did not offer a formal means of assessment; rather, they focused only on delivering content, either in the format of written phrasebooks or audio lessons.
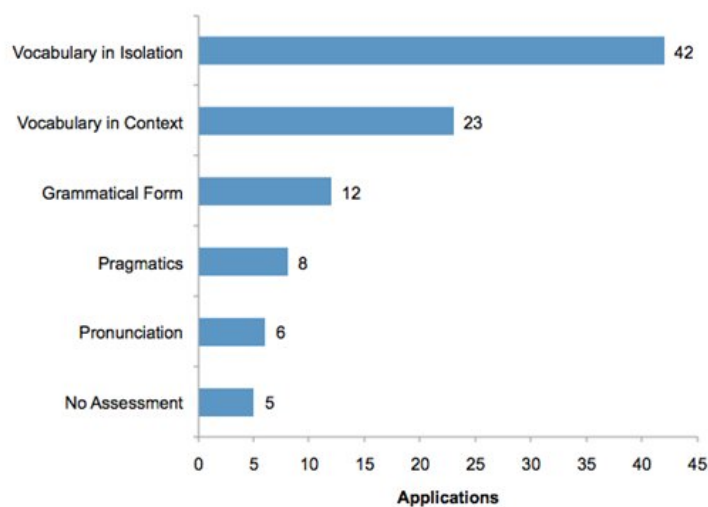
Figure 1. Areas of assessed instructional focus in language learning apps.

5.6. Implicit and explicit grammar instruction

Implicit grammar requires users to make inferences about grammatical form and meaning without the use of any metalinguistic terminology. Explicit grammar instruction was classified as either direct presentation of grammatical rules to the user, or corrective feedback that made explicit references to grammatical errors made by the user (Figure 2).

In many apps (21 of 50, 42%), no grammar instruction was evident; this typically occurs when apps assess individual vocabulary items without context. In the remaining 29 apps that did include grammatical instruction, feedback was coded as implicit or explicit. Some apps were coded for both as they contained both implicit and explicit styles of instruction. A sizeable group (19 of 50, 38%) included an implicit grammar instruction approach. A smaller number of apps (10 of 50, 20%) provided an explicit grammatical presentation to users, whereas only 3 of 50 apps (6%) provided feedback that made explicit reference to specific grammatical errors made by the user.
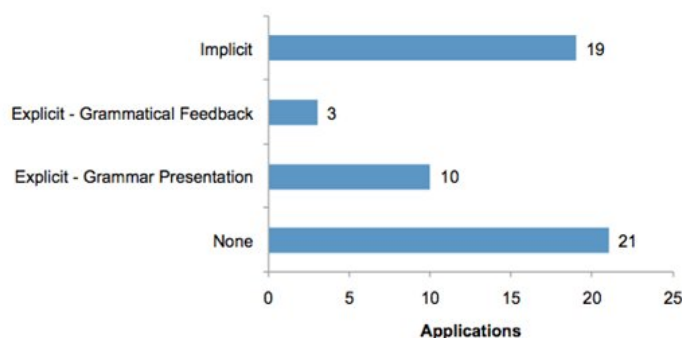
Figure 2. Implicit versus explicit instruction in language learning apps.

5.7. Corrective feedback

Corrective feedback occurs when an app assesses the user's language input and provides correction when necessary (Figure 3). The most common types of feedback given are visual (41 of 50, 82%) or sound effects (32 of 50, 64%). Some apps (14 of 50, 28%) offered simple textual corrections (i.e. providing the correct answer in the place of the wrong answer), yet only 3 of 50 apps (6%) provided any explanation as to *why* certain mistakes that were made were incorrect.
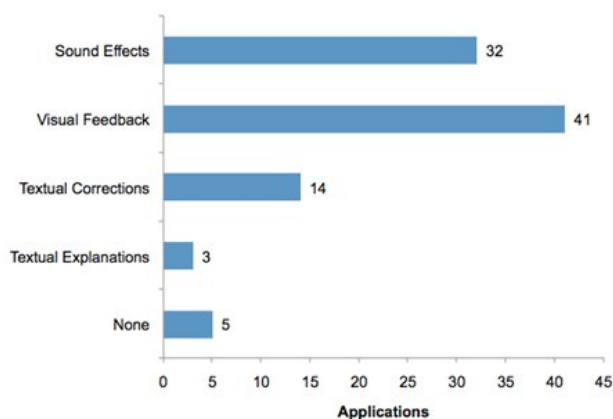
Figure 3. Corrective feedback in language learning apps.

5.8. User interaction - listening, reading and writing

We also examined the frequency and types of user interaction (listening, reading, or writing) with the apps, and categorized these by the level of language involved (e.g. words, sentences or passages) (Figure 4). Writing included typing via onscreen keyboard, selecting letters to form words, and words to form sentences.

Users most often interact with language on the word or sentence level when listening, reading, and writing on a mobile device. Writing is the most underutilized skill in comparison to listening and reading. In a small number of apps emphasizing spelling, letters were occasionally targeted for listening, reading, or writing. Longer forms of input and output, such as songs, dialogues, and passages, were very rare in all skill areas. Apps tended to focus on receptive skills such as listening or reading combined with simple activities like fill the blank or drag & drop, rather than productive skills, like speaking or text production. Open-ended activities were rare, and written or spoken production was generally limited to very simple one word utterances, allowing for the app to easily assess input and provide corrective feedback.
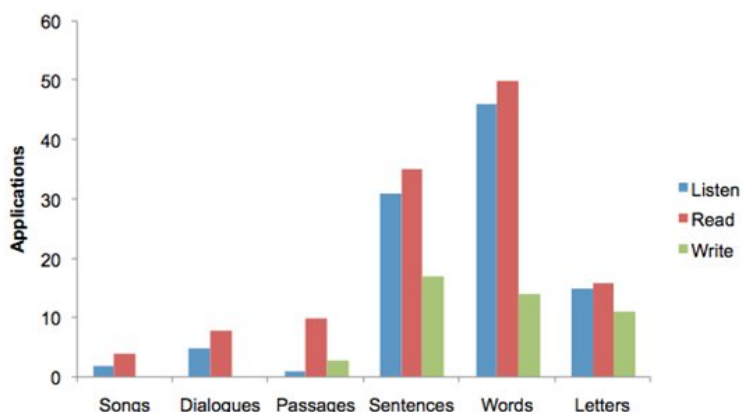
Figure 4. User interaction – listening, reading and writing.

6. Discussion

From our analysis, three major trends were found. First, the majority of apps tend to teach vocabulary units in isolated chunks rather than in relevant contexts. Second, many apps tend not to adapt to suit the skill sets of individual learners. Third, current apps tend to offer minimal explanatory corrective feedback to learners. These findings provide areas of focus for next-generation language learning apps.

6.1. Vocabulary instruction

Our results showed that vocabulary instruction was the main instructional focus of apps –and in some cases, the only instructional focus. In 84% of apps (42 out of 50), vocabulary was taught in isolation, while only 23 of 50 apps (53%) taught vocabulary in context. An example contrasting *vocabulary units in isolation* versus *vocabulary units in context* is depicted in Figure 5. A common activity used to assess vocabulary in isolation was to match images to meanings of words. Oftentimes these activities were gamified through time constraints or aesthetics, such as an activity from Mindsnacks Spanish (Figure 5, left). In this activity, the user must fill up a frog's belly by identifying the image that matches a given word in order to provide the frog with a snack. In contrast, activities such as the "cloze" test from DuoLingo (Figure 5, center) and Voxy (Figure 5, right) assess vocabulary in context. While the Mindsnacks game combines visually-appealing images with music and sound, the user is not provided any textual environment for the words, but rather matches words to pictures.
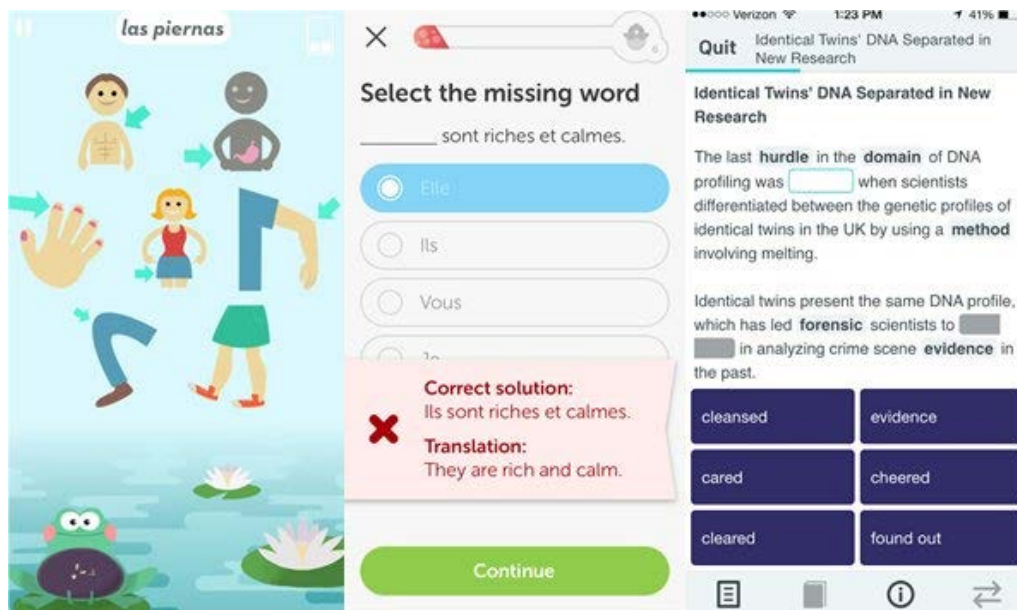
Figure 5. Exercises contrasting vocabulary in isolation, as in in MindSnacks Spanish (left), versus vocabulary in context, as in DuoLingo (center) and Voxy (right).

Context plays an important role in language learning. New contexts for lexical items allow learners to enrich knowledge of that word by understanding varied senses of meaning. The more times one comes across a word in a different context, the better understanding one has of both the immediate and extended senses of the word. Additionally, Nation (2015) has noted that vocabulary knowledge is a function of the number of times one is exposed to a word as well as the quality of each meeting. The attention given to the word can either be incidental or deliberate. While all of these apps draw deliberate attention to the vocabulary units in question, context provides additional means for learners to strengthen their vocabulary knowledge through incidental repeated exposure to new words.

Many of the reading contexts were limited to sentences and not full reading passages. Only 8 of 50 apps, (16%) called for the user to read dialogues and only 10 of 50 apps (20%) included reading passages (textual content longer than a sentence), such as the one from Voxy (Figure 5, right). While some developers might dismiss the idea of including longer reading passages due to limited attention span of users related to the portable nature of phones, positive learning outcomes have been reported by users (Wang and Smith, 2013; Chen & Hsu, 2008; Wu et. al. 2011). Such activities are encouraged as they would provide learners with a means to situate vocabulary in authentic and meaningful texts, and thus be able to recognize when and how to apply them in the future.

When vocabulary is taught in a flashcard style –matching word to meaning (whether represented textually, or visually, as in the Mindsnacks game above)– learners may improve their knowledge of the immediate or central sense of a word, the literal, or lexical meaning (Purpura, 2003). However, the interactional or pragmatic meaning of the word is not addressed, meaning that learners will not fully understand the appropriate contexts for use of the word. Additionally, a focus on literal meaning means that users will miss out on understanding other senses of the word, such as the morphosyntactic form, which includes "articles, prepositions, pronouns, affixes, syntactic structures, word order, simple, compound, and complex sentences, mood, voice, and modality" as well as the morphosyntactic meaning, which allows us to understand the word in relation to time, negation, to show focus, contrast, and attitude (Purpura, 2003, p. 94). A user may know a verb, but have no idea how to conjugate it or put it in a sentence.

By teaching vocabulary in context, some grammatical information is typically deduced rather than taught explicitly. In the example of DuoLingo (Figure 5, center), the user is asked to select the appropriate pronoun to complete the sentence from a list of options.

This task additionally assesses understanding of grammatical form by requiring user knowledge of subject-verb agreement. However, the user still has to make inferences about the correspondence of pronouns in French and pronouns in English. The user must be able to infer that "they" is the third person plural; this information is not explicitly stated.

In contrast, apps such as Babbel provide more explicit grammar instruction, where users are given metalinguistic information about words as they are acquired. While learning the personal pronoun "tú," for instance, the user is provided some clues: "sg., informal." in 38 of 50 apps, 42% of cases, no grammar instruction was evident at all, either implicit or explicit, and most often this was because of a lack of context for words due to a vocabulary-drill-only approach.

Of the apps that did include a focus other than vocabulary instruction, 18 of 50 (36%) of apps included an *implicit* grammar instruction approach, and 12 of 50 (24%) provided *explicit* instruction, in which users were coached to understand grammatical meaning. The remaining 20 apps were coded as having no grammatical instruction. There are benefits and drawbacks to both approaches, and learning style will no doubt factor into a preference for inductive or deductive learning. While implicit grammar instruction may be beneficial in that it allows learners to take ownership of their learning discoveries, it may also cause learners to make incorrect assumptions about grammar. Explicit grammar instruction is challenging given the constraints of the mobile device, such as screen and file sizes, but it may detract learners from a focus on fluency. It is likely that a combined approach is most ideal.

Ultimately, a design focused solely on drilling isolated vocabulary units represents a one-dimensional approach to language learning. There is wide recognition that vocabulary is only one component in models of language ability (e.g. Canale and Swain, 1980; Bachman and Palmer, 1996; Purpura, 2004). Therefore, if these apps intend to instruct in a more holistic way, it is essential to move beyond vocabulary drilling.

6.2. Adaptation

One of the greatest advantages of software-as-teacher, as compared to human-as-teacher, is that software possesses the potential to record complex user input in a precise, reliable manner. While a teacher may not remember every error that a student generates, software, if developed properly, could provide invaluable formative information that would otherwise be too substantial for a human to plausibly record. This ability for software to automatically update its functionality based on input received or data processed is known as adaptive learning. While growing in popularity, it is still a largely unexplored arena in mobile language learning applications.

Machine learning has been incorporated into the field of educational technology via Intelligent Tutoring Systems (ITS), or more specifically, Intelligent Language Tutoring Systems (ILTS), which offer users a way to interact with a computer by individually adjusting the sequence of instruction based upon user input (Gamper & Knapp, 2002; Moundridou & Virvou, 2003, Stockwell, 2007). An ITS system would be able to make "intelligent" decisions, such as adjusting the level placement of the user based on their performance, determining which areas require additional exercise to compensate for weaknesses, modifying settings to appropriately scaffold content based on the skill level of the user, or even changing visual cues in order to better motivate. The screenshots from Mondly, Memrise, and Mindsnacks shown in Figure 6 display performance analyses shown upon user completion of levels. In some instances, these data are used to motivate the user to improve their performance, but are only minimally used to adjust the level of gameplay to match the level of the user. For instance, in Mondly (Figure 6, left), the user obtains experience points (XP) for completing levels, and users can log in via Facebook to compare their XP level to other users. This allows progress to be tracked from level to level, but nonetheless the path from level to level remains the same regardless of the user.
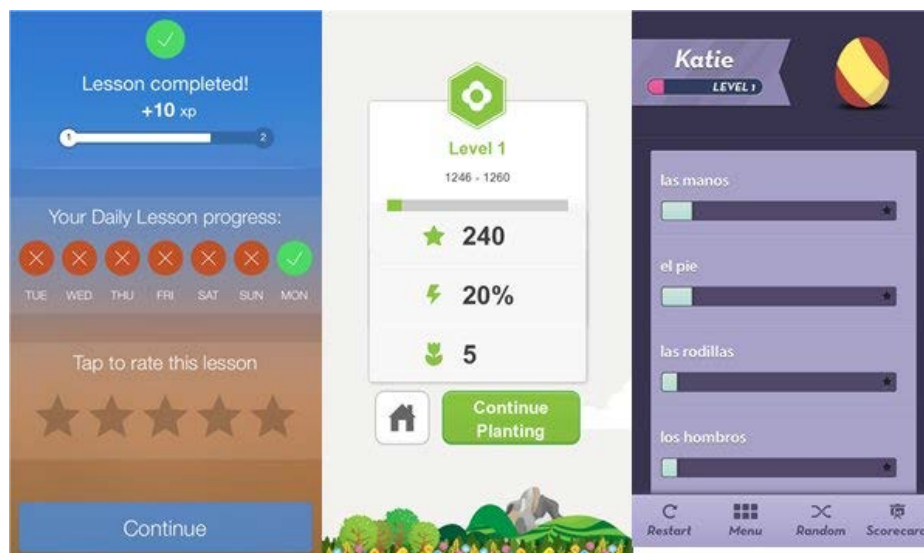
Figure 6. Performance analyses provided byMondly (left), Memrise (center), and Mindsnacks (right).

We believe that the information collected by apps ought to be used *formatively,* rather than displayed as a summative performance analysis. Just as teachers adjust their explanations to suit the needs of their students, apps should adjust their content to suit the needs of users. To accomplish this, results ought to be used by machine learning algorithms to adjust functionality accordingly. By coding into language apps the types of grammar mistakes that users make while practicing on the app, it would be possible to identify the frequency of different types of learner errors. Presenting this information to the learner could lead them to notice mistakes that would otherwise go undetected; for instance, they might realize that they frequently replace present perfect for past tense forms, or that they tend to drop certain endings. Using machine learning algorithms, apps could adjust activities based upon the rate of various errors present, allowing users to spend more time practicing those forms that are appropriately challenging to the learner, making gameplay more intriguing, less routine, and more likely to result in learning outcomes.

While this feature was not readily apparent in any of the apps that were coded for grammatical instruction, a similar adaptive feature was noted in apps that teach vocabulary. For instance, both Memrise (Figure 6) and Mindsnacks (Figure 6, right), apps for vocabulary instruction, exemplify adaptive learning in vocabulary instruction. These two apps determine mastery based upon how many times a user has answered a question containing a given vocabulary word correctly. Memrise uses machine learning technology to continue asking the user questions on words that have not yet been mastered. In Mindsnacks, a series of bars indicating the user's mastery of a list of words is displayed on the screen at the end of each level. The program then increases the frequency of the most challenging words for the user in future tasks.

This movement from simple to complex tasks (or an increase in the frequency of challenging words) is compatible with both behaviorist and constructivist approaches, with a caveat. While a behaviorist approach might emphasize strengthening through repetition and increases in frequency, a constructivist approach would emphasize strengthening through *understanding* of ideas. As constructs have social origins, and "people construct experience according to the organization of the cognitive system […] A corollary is that ICALL must teach learners all the metacognitive tools necessary for appropriate self-regulation" (Oxford, 1998, p. 362). Combining this adaptability with better feedback, which will be described in the next section, is more likely to provide learners with the necessary tools to understand and improve their performance.

6.3. Feedback

While there is much debate about the best way to deliver feedback to learners, many studies in second language acquisition have revealed the efficacy of explicit metalinguistic feedback (e.g. Carrol & Swain, 1993; Lyster & Ranta, 1997; Ellis,

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Loewen, & Erlam, 2006). Knowing that an utterance is ungrammatical (i.e. having "negative evidence") is important, but knowing *why* this is the case further enables the learner to avoid making these mistakes in the future, and also avoids the pitfalls of the behaviorist tendency to essentialize and overlook the quality of knowledge gained. As Pellegrino, Chudowski, and Glaser (2001) have noted: "Whereas […] the behaviorist approach focuses on how much knowledge someone has, cognitive theory also emphasizes what type of knowledge someone has. An important purpose of assessment is not only to determine what people know, but also to assess how, when, and where they use what they know" (p. 62).

Typically, it was found that feedback in apps was most often given through visual clues such as color changes or highlights (40 of 50 apps, 82%), or through the use of sound effects (31 of 50 apps, 63%). Only 14 of 50 apps (28%) offered any textual feedback, and an even lower 3 of 50 apps (6%) offered explanations to users about why their choices may be incorrect. Our analysis revealed that apps have done a poor job at providing useful feedback to users. Without additional information from apps about why users are making mistakes, the likelihood that these activities will result in learning is diminished.

Many ITS systems include an NLP pipeline in which different modules are systematically executed —such as tokenization, part-of-speech tagging, lemmatization, parsing, etc.— in order to interpret user input to the device. This functionality would equip apps with the power to make better decisions based upon the text —for instance, knowing that the user has typed the correct word, but perhaps the wrong form. Or at the sentential level, knowing that the user has typed the correct words, but, for example, has placed an adjective in the incorrect place with respect to the noun it modifies. If the computer is able to actually comprehend and process user input, it would be much easier to provide feedback that is uniquely tailored to users and their particular types of errors.

Without the ability to parse words, the skill of writing is generally neglected in comparison to listening and reading. Only 13 of the 50 apps (26%) allowed users to write full words. We would recommend the incorporation of more adaptive technology that can understand what types of mistakes users are making, and thus provide more intelligent, personalized feedback.

7. Conclusion

Our review has shown that, in the commercial app space, there is a predominant focus on teaching language as isolated vocabulary words rather than contextualized usage. Most use drill-like mechanisms and offer very little explanatory corrective feedback, and there is little adaptation to the needs of individual learners. Despite advances in language teaching that have stressed the importance of communicative competence in language learning, MALL technology is still primarily utilized for vocabulary instruction rather than fluency-building.

This paper examined commercial applications; nonetheless, given the influence of academic research on commercial MALL application, the relevancy of these suggestions need to be considered. The focus on vocabulary instruction is prevalent in MALL research, as noted, but more focus on adaptive learning and intelligent design features in applications —especially those which highlight learning outcomes— would be useful target areas for future research.

Overall, there is great opportunity to leverage emerging technologies for language learning; we suggest a stronger emphasis on intelligent commercial app design. By providing more contextualized, authentic written input, users will begin to process more than individual words and basic vocabulary. The incorporation of more adaptive learning features would provide a more personalized experience, both in terms of content delivered during instruction as well as feedback. NLP technologies could allow for more accurate recognition of written text. Such a design methodology would teach authentic usage of language with an end-goal focus of making learners communicatively competent in the language they intend to learn. In this way, language educational technology can move past "drill and kill" behaviorist-style instruction that has long-since been abandoned in language classrooms, and turn toward a more communicative,

holistic model that reflects our current understanding of language ability and acquisition.

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Appendix A. Selection of 50 Language Learning Apps.

App Name	App Store Ranking	Google Play Ranking
Duolingo	1	1
Rosetta Stone	2	3
Memrise	3	17
PenyoPal	13	
Learn English (Anspear)	15	
Mindsnacks	16, 27, 33, 43	
Learn [Language] with Lingo Arcade	18, 46	
Speak American English FREE (Mondly, ATi Studios)	20	
Innovative Language 101	21	
Busuu	22, 42, 54, 59, 62	6, 57, 67, 69, 90
ChineseSkill	23	
Vocabulary and Grammar! (TribalNova)	24	
Japanese!! (Square Poet)	35	
Translate Keyboard Pro	36	
Human Japanese Lite (Brak Software)	45	
Spanish by Living Language (Random House Inc)	47	

English with LinguaLeo	49	
Salsa - Spanish Language Learning (Mobile Madness)	50	
Learn Phrasebook (Codegent)	53	28, 37, 61, 63, 84
Speak Spanish - For Survival (Brainscape)	56	
Voxy	57	46
Voxy	57	
Fit Brains Language Trainer (Rosetta Stone)	28	
Phrasebook (Bravolol)	29	
Learn & Play Languages (CoolForest Publishing)	30	
Learn Spanish - Brainscape	32	
FREE 24/7 Language Learning	4, 6, 14, 19, 34, 55	
Language Learning Games for Kids (StudyCat Limited)	40, 43, 51	33
Learn Japanese/Chinese/English Easily (Wan Peng)	7, 38, 41	
Hangman for Spanish Learners		22
Learn Arabic (AppVerx Limited)		32
Learn English Conversation Free (rwabee)		48
Learn English, Speak English (Speaking Pal)		49
Learn Languages: English (Jose Ortega)		21
Learning Japanese (Ignatius Reza)		27
Babbel - Learn Langage		7, 14, 24
Byki Mobile		51
Easy Language Learning (PinDropApps)		9, 19, 59, 68, 100
English Podcast for Learners (tidahouse)		12
English-App: Learn English (Culture Alley)		42
HelloTalk Language Exchange		53
Learn 50 Languages		2, 31, 54, 60, 66, 75, 81, 88, 89
Learn 6,000 Words (Fun Easy Learn)		13, 36, 38, 39, 50, 58, 76

Learn English (Rwabee)		29
Learn English Kids Languages (Pinfloy Mobile Games)		16
Learn English/ Korean/ Portuguese/ Chinese/ etc. (bravolol)		5, 44, 78, 80, 87
Learn Languages Free (Murat)		35
Learning Japanese (sagetsang)		8
Lerni. learn languages		26
Mango Languages		25
Play & Learn LANGUAGES (Shift Interactive Party Ltd)		34
Sight Words Learning Games		47
Tourist Language Learn & Speak		4

Appendix B. Survey Instrument.

Q1. Name of the App

Q2. Possible reason for deletion

Q3. Rater

Q2. Languages Supported

1) English

2) German

3) French

4) Spanish

5) Italian

6) Japanese

7) Portuguese

8) Russian

9) Turkish

10) Arabic

11) Chinese

12) Polish

13) Thai

14) Swedish

15) Hindi/Urdu

16) Bengali

17) Korean

18) Swahili

19) Finnish

20) Greek

21) Other: _____

Q3. Platforms Supported

Q10. Implicit/Explicit Grammar Instruction

1) Implicit

2) Explicit - grammar presentation (rules explained prior to activity)

3) Explicit - feedback (rules explained when you make a mistake)

4) None (words taught in isolation)

5) Other: _____

Q11. Types of Feedback

1) None

2) Non-corrective (sound effects, visuals)

3) Corrective feedback but no editing of mistake required by the user

4) Corrective feedback with editing of mistake required by the user

5) Other: _____

Q12. Types of Feedback

1) None

2) Sound effects

3) Visual feedback (colors, icons, etc.)

4) Simple textual feedback (Corrections)

5) Textual explanation

6) Other: _____

Q13. Types of Feedback

1) No editing (moves onto the next question)

2) Editing required by process of elimination

3) Hint or suggestion provided

1) iOS

2) Android

3) Windows Phone

4) Blackberry

5) Other: _____

Q4. Monetization

1) None

2) In-app ads

3) Pay to unlock levels

4) Subscription

5) Power-ups

6) Upgrades

7) Pay to unlock languages

8) Other: _____

Q5. Gamification

1) Lives or health

2) Positive/Negative reinforcement

3) Time limits

4) Progress indication

5) Cumulative point system

6) Achievements/Badge/Accomplishments

7) Missions/Quests/Tasks

8) Random rewards (same each time)

9) Fixed rewards (same each time)

10) New daily content

11) Unlocking levels

12) Win condition

13) 2D world

14) 3D world

15) Narrative

16) Avatar - representation of self

17) Other: _____

Q6. User level placement (i.e. How does the app know the user's level)

1) None

2) Preliminary testing

3) Option to test out of activities/levels

4) Manual level selection

5) Other: _____

Q7. Audio Requirements

1) None

2) Speaker

3) Microphone

4) Other: _____

Q8. User Input to Device

1) Keyboard (writing)

2) Touch gestures (tapping, swiping)

3) Speaking (microphone)

4) Copy correct answer

5) Other: _____

Q14. Game Mechanics

1) Selection - pick the correct answer

2) Matching image to meaning

3) Matching/selecting/writing L2 word(s) to correspond with L1 meaning (translation)

4) Matching/selecting/writing L2 word(s) to correspond with L2 meaning (definition)

5) Cloze

6) Other: _____

Q15. Visual Input

1) Words

2) Images

3) Videos

4) Animations

5) Other: _____

Q16. Listening

1) None

2) Listen to letters

3) Listen to words

4) Listen to sentences

5) Listen to dialogues

6) Listen to passages

7) Listen to songs

8) Other: _____

Q17. Reading

1) Read letters

2) Read words

3) Read sentences

4) Read passages

5) Read dialogues

6) Read songs

7) None

8) Other: _____

Q18. Writing

1) Write letters on keyboards

2) Write words on keyboards

3) Write sentences on keyboards

4) Write passages on keyboards

5) Moving/selecting words to form sentences

6) Moving/Selecting letters to form words

7) None

8) Other: _____

Q19. Speaking

1) Repetition

2) Reply

3) None

4) Other: _____

Q9. Elements of language instruction (NOTE: code ONLY if element is assessed in app)

1) Vocabulary - isolated units

2) Vocabulary - in context

3) Grammar (sentence construction, verb tenses, etc.)

4) Pragmatics (usage/appropriacy)

5) Pronunciation

4) Other: _____

Q20. Social Integration

1) Peer review

2) Tutoring services

3) Chatting

4) Native speaker review

5) None

6) Other: _____

Q21. Comments

Recommended website

BonPatron.com

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_____

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1. Introduction

BonPatron.com est un correcteur de grammaire et d'orthographe gratuit créé en 2001 par Stéfan Sinclair (Université McGill à Montréal) et Terry Nadasdi (Université d'Alberta à Edmonton). BonPatron.com a été conçu pour des usagers anglophones qui étudient le français ou le parlent comme langue seconde. Cependant, dans la foire aux questions (FAQ), les auteurs signalent que «BonPatron s'emploie fréquemment par les employés et utilisateurs d'Emploithèque (site d'offres d'emploi de la Fonction Publique Française)». Le site BonPatron s'adresserait donc aussi à des francophones. Quoique BonPatron.com ait été créé au Canada, la variété ciblée par ce guide est le français standard écrit.

Il existe deux versions: BonPatron.com, qui est gratuite; et Pro.BonPatron.com, qui est payante. Selon les auteurs, la version Pro offre des avantages importants: un résumé de fautes suivi d'explications explicites, un outil de conjugaison et des exercices reliés aux fautes commises. Cette version permet aussi l'utilisation du plein écran sans publicité et sans aucune restriction de longueur et d'un dossier d'écriture personnel, ainsi que l'accès gratuit à la version Pro de *SpellCheckPlus.com* et le soutien économique de ce projet.

2. Description du contenu

En entrant dans le site de BonPatron (Figure 1), les instructions d'utilisation sont clairement affichées. Une grande fenêtre permet de taper ou de copier-coller un texte écrit en français et de cliquer sur le bouton *Vérifier le texte* pour soumettre le texte. Sous ce bouton, l'utilisateur-apprenant peut lire un *exemple* de correction et *effacer* le contenu de la fenêtre.

Figure 1. Page d'accueil de http://bonpatron.com.

Il est aussi possible d'utiliser d'autres outils qui sont indiqués au-dessus de cette fenêtre: *Vérifier; Copier le texte brut; Tout sélectionner; Coller comme texte brut; Coller un texte créé sous Word; Enlever le formatage, y compris les explications (texte brut); Rechercher; Rechercher/Remplacer; Insérer des caractères spéciaux; Imprimer; Imprimer le texte.* Dans la version Pro, une autre touche permet de *passer en mode plein écran.*

La langue de l'interface peut être modifiée pour recevoir des commentaires en français ou en anglais. Il faut noter que le texte affiché s'efface quand on change la langue d'interface. Sur la grande fenêtre et à côté des deux langues de l'interface, il y des touches pour insérer les accents. Cette fonction n'est disponible que dans la version Pro.

Sous la grande fenêtre, l'utilisateur peut marquer deux options: *«je» est féminin* et *je suis francophone.* Dans le premier cas, BonPatron interprète toujours la première personne du singulier au féminin ; et dans le deuxième cas, les corrections de BonPatron ciblent des locuteurs natifs. Les auteurs de BonPatron conseillent de ne pas marquer cette dernière option pour obtenir plus de renseignements utiles aux apprenants de la langue française. Dans la version Pro, il est possible de cliquer sur une autre troisième option: «pas d'espace devant la ponctuation». Selon les auteurs de ce site, cette option «permet de mieux conformer aux pratiques régionales de ponctuation». De même, l'utilisateur peut cliquer sur trois autres outils: *Conjugaison des verbes; Enrichissement de vocabulaire; et Dictionnaire anglais-français.* Cette dernière fonction n'est disponible que dans la version Pro.

Puis, l'apprenant peut cliquer sur l'icône «*Nos ressources linguistiques*», qui contient les outils suivants: correcteur de grammaire; guide de grammaire; guide de vocabulaire; outil de conjugaison; dictionnaire anglais-français; dictionnaire de synonyme; et guide de phonétique.

Le correcteur de grammaire, le dictionnaire anglais-français et le dictionnaire de synonyme renvoient à la page d'accueil.

Le guide de grammaire (Guide de grammaire pour non-francophones) comprend plusieurs dossiers: les verbes, les noms, les déterminants, les pronoms, les adjectifs, les adverbes, les prépositions, les conjonctions, les nombres, la date et l'heure, l'orthographe et la ponctuation, anglicismes à éviter et un examen final. D'après les auteurs de BonPatron, «ce guide fournit une explication des grandes catégories grammaticales, des règles grammaticales, des exceptions principales et des fautes à éviter».

Le guide de vocabulaire (*French Vocabulary Guide*) propose plusieurs sujets avec des exercices de compréhension orale et de production écrite, suivis d'un jeu pour réviser le vocabulaire (*Play the game*). Les sujets, affichés dans deux colonnes, en anglais et en français, sont les suivants : *Basic Expressions, Animals, The Body, Business, Clothing, Colours and Characteristics, Dates and Time, Food, Greetings, Health, Household, Numbers, People, Restaurant, School, Sports, Travel, Weather.* Pour finir cette section, les apprenants peuvent faire d'autres exercices (*Practice*) et passer un examen final noté (*Final Exam*).

L'outil de conjugaison permet de taper un verbe et le programme renvoie ce verbe conjugué aux temps suivants : présent, passé composé, imparfait, futur simple, conditionnel présent, conditionnel passé, plus-que-parfait, subjonctif présent, impératif présent et participe présent.

Le guide de phonétique (Guide de phonétique corrective) est destiné à des apprenants anglophones de français langue seconde. La transcription phonétique permet d'apprendre ou d'approfondir la prononciation du français standard et d'éviter les fautes dues à l'influence de l'anglais. Ce guide est composé de plusieurs chapitres: survol des concepts clés, les symboles phonétiques, le rythme et l'accentuation, l'intonation, les voyelles, les semi-consonnes, les consonnes, le E instable, la liaison et l'enchaînement, exercices de transcription, ressources et références. Tous ces chapitres sont accompagnés d'exercices interactifs. Comme dans la section précédente, les apprenants peuvent aussi faire un examen final noté.

3. Stratégie pédagogique

Selon les auteurs, la stratégie pédagogique suivie dans BonPatron.com « encourage l'apprentissage ». C'est une approche pédagogique par étapes. Quand l'utilisateur-apprenant tape directement son texte ou soumet un texte rédigé sous un format Word, BonPatron.com l'examine et indique trois types de fautes : (1) les fautes d'orthographe en lettres rouges; (2) les fautes grammaticales à modifier encadrées en rouge ; et (3) les fautes grammaticales à vérifier encadrées en jaune (Figure 2).

Figure 2. Exemple de correction de BonPatron.com.

Pour lire les commentaires, il faut passer la souris sur les fautes repérées par BonPatron.com. Une info-pub s'ouvre avec des explications faciles à comprendre et des exemples de bon usage (Figure 3).

Figure 3. Exemple de correction de BonPatron.com.

L'apprenant doit alors corriger les fautes en suivant les explications proposées. Il participe activement de son apprentissage en faisant lui-même les modifications nécessaires pour corriger son propre texte. Puis, l'apprenant soumet de nouveau son texte jusqu'à ce que toutes les fautes soient corrigées.

D'après les auteurs, les règles qui identifient les erreurs ont été créées à l'aide des erreurs repérées dans les textes soumis su site BonPatron. Puis, d'autres règles «ont été conçues selon l'intuition des auteurs, tous bilingues, et selon les règles de grammaire qui causent habituellement des ennuis pour les personnes qui parlent l'anglais (choix des prépositions, pronoms, etc.)».

En plus, l'apprenant peut faire, de manière autonome, les exercices et les examens finals proposés dans les guides de grammaire, de vocabulaire et de phonétique de la section « Nos ressources linguistiques » pour réviser et améliorer son niveau en français.

4. Evaluation technique du site BonPatron

4.1. Interactivité et navigation

L'utilisateur du site BonPatron contrôle parfaitement son cheminement dans le site. Il doit interagir pour corriger lui-même son texte, car aucune correction automatique est affichée. L'adresse web est facile à retenir. La page d'accueil donne une vision claire de l'objectif et du contenu du site. Le temps de transfert des pages étant adéquat, la navigation est simple et efficace. Cependant, elle est moyennement perturbée par les bannières de publicité qui s'affichent en bas, en haut et sur le côté droit de l'écran. Les auteurs justifient la publicité car elle leur permet de payer les frais d'administration du site et d'éviter ainsi que les utilisateurs payent des frais d'utilisation. La version Pro de BonPatron, qui est payante, ne contient pas de publicité.

4.2. Crédibilité, validité et actualisation du site

La crédibilité et la validité de ce site sont certifiées par l'expérience pédagogique des auteurs qui peut être consultée sur leurs sites Web respectifs: http://stefansinclair.name et http://www.ualberta.ca/~tnadasdi/. De même, les explications fournies dans les ressources linguistiques permettent d'être suivies aisément par les apprenants cible de ce guide. En ce qui concerne l'actualisation du site, les auteurs signalent qu'il est actualisé plusieurs fois par semaine (FAQ).

5. Appréciation générale

Le site BonPatron.com est un correcteur de grammaire et d'orthographe qui est aussi un bon outil pour l'auto-apprentissage du français pour des apprenants anglophones, ayant un niveau intermédiaire en français langue étrangère (FLE). La stratégie pédagogique suivie favorise et «encourage l'apprentissage» autonome. L'apprenant apprend tout seul, car ce logiciel ne corrige pas les fautes, il ne fait que les signaler. C'est l'apprenant qui doit les corriger en suivant les commentaires affichés et en lisant les explications accessibles en cliquant sur le mot «guide» qui apparaît dans le résumé des fautes commises et qui renvoie à la section «Nos ressources linguistiques ». Il est aussi possible pour l'apprenant de réviser et d'améliorer son niveau en français en réalisant, de manière autonome, les exercices de la section «Nos ressources linguistiques».

L'objectif principal de BonPatron est d'aider les utilisateurs à améliorer leur français écrit. Cependant, grâce au guide de phonétique, les apprenants peuvent aussi réviser et améliorer leur compétence auditive en écoutant des mots et des phrases en français dans les explications et les exercices proposés. De même, les apprenants peuvent accéder à deux ressources très intéressantes pour améliorer leur niveau en français oral: (a) un site qui transforme un texte français en symboles phonétiques (http://easypronunciation.com/en/french-phonetic-transcription-converter#result) et (b) un site qui prononce ce que l'apprenant écrit en français (http://imtranslator.net/translate-and-speak/speak/french).

Il est important de souligner que ce logiciel ne reconnaît pas toujours les fautes commises par les apprenants, car il identifie les erreurs à l'aide de règles préétablies, en fonction des erreurs repérées dans des textes soumis précédemment. C'est pour cela que les utilisateurs peuvent recommander la création de règles. D'après les auteurs, les

observations des utilisateurs (fautes repérées ou nouvelles règles) sont toujours les bienvenues. L'interaction entre les apprenants et les auteurs de ce site constitue un autre bon atout de BonPatron.

Des aspects intéressants de BonPatron sont à signaler: Il est gratuit et accessible en tout temps via Internet. Puis, la version Pro offre d'autres avantages: elle est sans limite (la version gratuite est limitée à des textes de moins de 3000 caractères); elle est libre de bannières publicitaires; elle permet d'archiver les textes soumis; et elle donne un accès gratuit à la version Pro de *SpellCheckPlus.com*.

Les auteurs de BonPatron ont créé un correcteur de grammaire et d'orthographe similaire pour anglophones étudiant l'espagnol qui s'appelle *SpanishChecker.com*. Il existe aussi une version payante (pro.spanishchecker.com). Ce correcteur espagnol reproduit quasiment le schéma de BonPatron. Parmi les différences localisées, nous mentionnerons les suivantes: (1) Il n'y a pas de section indépendante pour la phonétique, mais dans le guide de vocabulaire, il y a une mini-section pour elle (*Pronunciation hints)*; et dans le guide de grammaire, il y en a une autre (*Spelling and Pronunciation)*; et (2) dans l'outil de conjugaison, le participe passé et l'impératif négatif ne sont affichés que dans le correcteur SpanishChecker. Selon les auteurs, ce correcteur doit être amélioré pour mieux répondre aux besoins des apprenants.

A notre avis, ces deux correcteurs de grammaire et d'orthographe, BonPatron.com et *SpanishChecker.com*, sont des outils fort adéquats pour l'auto-apprentissage du français et de l'espagnol, niveau intermédiaire, pour des apprenants anglophones. D'une part, l'approche pédagogique de ces logiciels (par étapes) favorise l'apprentissage en douceur de ces deux langues secondes et, d'autre part, la méthode utilisée (repérage de fautes sans correction automatique) permet à l'apprenant de devenir un acteur actif de son apprentissage.

Teacher training

Content and Language Integrated Learning with Technologies: a global online training experience

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Abstract

The focus of this report is the link between CLIL (Content and Language Integrated Learning) and CALL (Computer-Assisted Language Learning), and in particular, the added value technologies can bring to the learning/ teaching of a foreign language and to the delivery of subject content through a foreign language. An example of a free online global training initiative on these topics will be described: "Techno-CLIL for EVO 2016". An overview of the course will be offered, detailing some of the asynchronous and synchronous activities proposed during the five-week training experience which registered about 5000 participants from all over the world. Special attention will be devoted to the feedback from the teachers on how this experience helped their professional growth as reflective practitioners.

Keywords: Content and Language Integrated Learning (CLIL), Computer-Assisted Language Learning (CALL), Teacher Training.

1. Introduction

In this early part of the 21st century the range of technologies available for use in language learning and teaching has become very diverse and the ways that they are being used in classrooms all over the world have become central to language practice. (Motteram, 2013, p.5).

The aforementioned quotation conveys the increasing importance technologies are having in language learning/ teaching and in the delivery of subject content through a foreign language, through CLIL (Content and Language Integrated Learning) methodology (Marsh, 1994; Coyle et al., 2010; Mehisto et al., 2008; Marsh et al., 2010; Langé & Cinganotto, 2014), which is spreading more and more all over Europe (Eurydice, 2012). In particular, Motteram (2013) and the other authors of the book offer an interesting overview of the ongoing debate in the field of CALL (Computer Assisted Language Learning), at the different levels of education. Moreover, Motteram introduces a very interesting socio-cultural analysis of CALL, which takes into account the key role of teachers in an EFL or in a CLIL class, considering not only the aspects of the teaching practice we may easily observe, but a lot of other indicators and variables, such as:

the time that they live in, or the place, the phase of education, the choice of a pedagogical approach, whether, for example, mobiles are allowed in the classroom, whether students have internet access at home, the attitudes of the community to the language that they are learning… (Motteram, 2013, p. 178).

The paper will focus on an example of a free online training initiative addressed to teachers and educators from all over the world, aimed at improving the continuous professional development in the field of CLIL and CALL, by activating a lot of different socio-cultural dimensions which are relevant to overcoming the challenges of 21st century education.

2. Overview of the online training initiative

During January and February 2016, the author of this paper, in cooperation with Daniela Cuccurullo, EFL teacher and CALL expert, moderated a free five-week training session on CLIL and ICT, titled "Techno-CLIL for EVO 2016". EVO, Electronic Village Online, TESOL International, is a global community of peers mainly dealing with language teaching and technologies. Techno-CLIL aimed at fulfilling the following objectives:

- discussing the theory, methodology and practice behind a CLIL approach
- considering how to plan CLIL class activities using the Internet and 2.0 web tools
- discussing teaching and assessing learners through a CLIL approach
- reflecting upon the participants' awareness of what CLIL is and on how to teach through it.

Therefore, the session was aimed at reinforcing the links between CLIL and ICT, eliciting reflections and discussions among teachers and sharing good practices from the different countries through synchronous and asynchronous activities.

This was the outline of the syllabus throughout the five weeks:

Week 1

Brainstorming

Introductions: sharing experiences with CLIL, comparing methodologies and strategies from a global perspective.

Week 2

Surfing the net

Exploring the potential of Web 2.0 in the implementation of CLIL. Suggestions, ideas and formats were given to design a digital CLIL lesson plan.

Week 3

CLIL pathways

Planning and implementing a CLIL path in sciences or humanities using web tools and the internet.

Week 4

Reading in CLIL

Exploring the potential of extensive reading to design a CLIL lesson, considering that books and eBooks can provide effective links to CLIL activities.

Week 5

CLIL repository

Guided web tours in groups to find resources such as videos and other materials in order to build up a repository of good practices for an innovative CLIL environment, such as BYOD (Bring Your Own Device) or flipped teaching practices.

The following dimensions were taken into account for the planning of the course:

- *Learner-centeredness*

The variety of online tools draw on individual learning styles and help become more versatile learners: the whole training pathway was designed to make participants the real protagonists of their learning experience, actively involving them from the very beginning.

- *Collaborative learning*

Online group work allows learners to become more active participants. Collaborative learning requires that learners understand inputs, organize and express their thinking with carefully constructed language in a coherent way. That was particularly demanding in Techno-CLIL, as for the majority of the participants English was not their mother tongue (a great number of them were Italian). A huge community of practice was

established through institutional channels (Moodle, WizIq, Wiki) and through informal environments, such as Facebook, where they could interact and help each other during the five weeks of training.

- *Easy access to global resources*

The course was designed to make a vast use of Open Educational Resources, guiding the participants to access online databases and resources relevant for CLIL.

- *Experiential learning*

New technologies can be used to engage and motivate students and improve their learning outcomes. One of the aims of the initiative was to spread sensitiveness towards the use of ICT for language learning/ teaching and for CLIL, through practical activities. Techno-CLIL was designed as a laboratory where participants could feel free to discover new tools and experiment them without any fear of mistakes.

3. Asynchronous activities

Asynchronous learning can be carried out by learners on their own, at their own pace, enjoying taking their time to accomplish tasks and assignments.

Each module was structured with asynchronous activities to carry out on the Moodle platform by downloading digital content, visiting suggested websites and online resources, uploading different kinds of assignments. For each module a specific forum thread encouraged the participants to share ideas and materials and to discuss the topic of the module.

A very interesting and useful aspect of the forum was the peer learning perspective, as teachers were invited to post their own contribution, but at the same time they had to read and comment on at least one post from the community forum. This led the participants to reflect, not only on their own learning pathway, but also on their peers', comparing the progress made and the activities carried out by their colleagues. This is advisable in order for the teacher to become a reflective practitioner (Schön, 1983).

Figure 1 below (Rose, n.d.), taken from the ECML-funded project under the title "Quality Assurance and Self-assessment for Schools and Teachers", can be considered as an inspiration for the teachers, who should always be able to reflect on their teaching practice and constantly review their plan or teaching element, taking into account many variables, such as their colleagues' experience, the students' learning outcomes, reactions and satisfaction, feedback from the school community, progress made, previous teaching elements, etc.
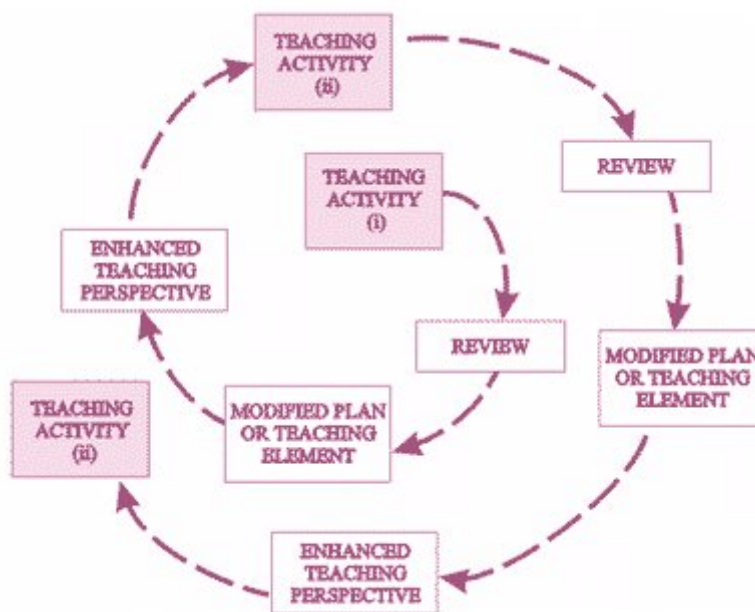
Figure 1. The reflective teacher.

In order to help the participants reflect more on their learning experience and on the competences acquired during the course, to be later applied in their classes, a transversal task was established across the five-week pathway, which consisted of a learning diary where the participants had to choose the web tool they preferred and note down the most relevant steps of their learning, collecting pictures, videos, resources, etc.

The results were outstanding: the teachers opted for a wide range of web tools, according to their favourite communicative and learning style. Some of them decided to document only the most relevant aspects of their adventure in Techno-CLIL, while others wanted to collect and remember each and every activity, webinar or resource.

An example of learning diary created with Padlet is shown in Figure 2.
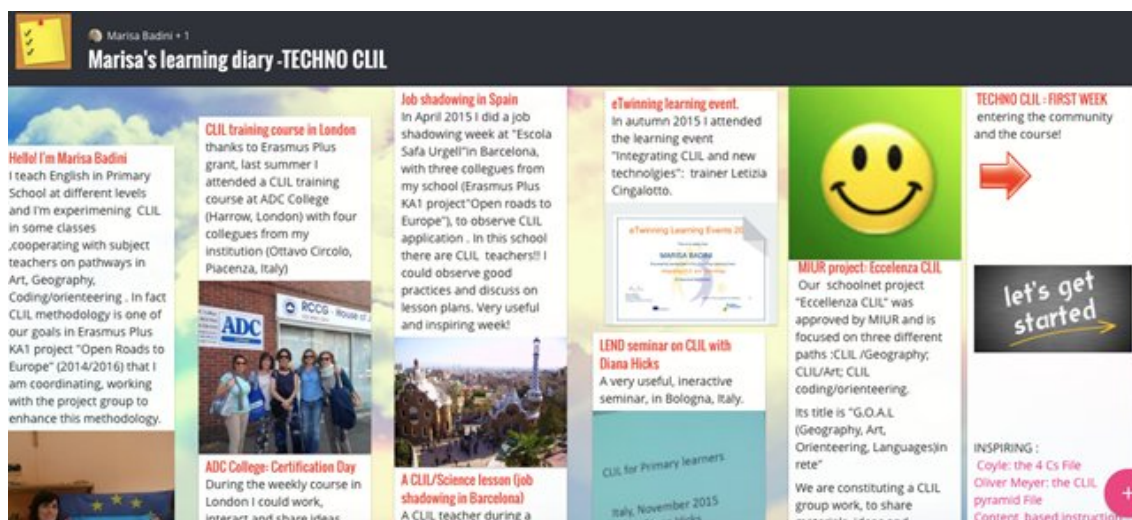
Figure 2. An example of learning diary using Padlet (reproduced with permission).

Padlet is a powerful webapp which allows messages, audio files, videos, pictures to be posted on a digital board that can be shared with other internet users. They can interact with the board, posting their own comments or files.

Padlet was one of the most common tools the teachers used to create their learning diary, as the graphic effects it generates are impressive. In the example shown in Figure 2, the teacher interweaves in her posts, significant moments from her past professional development with relevant memories from her Techno-CLIL experience.

Another task which was assigned to help the teachers' self-reflection was "My experience in Techno-CLIL" template, which was aimed at collecting the participants' feedback about different specific aspects of the training initiative, such as their favourite webinar, the easiest activity, the most useful resource etc. This template was not only a self-reflection tool, but also an important instrument to help the moderators understand weaknesses and strengths of Techno-CLIL.

TECHNO-CLIL FOR EVO 2016
Moderators: Letizia Cinganotto & Daniela Cuccurullo
Mentor: Nellie Deutsch

My experience in Techno-CLIL

Name and surname	Nicoletta Ferri
Country and city	Italy - Piacenza
School level	Primary School
Subject/s taught	I teach Italian and English in class 1
CLIL previous experience (if any)	I had never attended a CLIL course before but I've been teaching English for years and I did some topics in English, especially in class 4 and 5, about healthy food, daily routine, animal... I helped the children to develop a project about their hometown with historical hints, pictures and explanations.
The best two webinars for you. Why?	20th Jan - Webinar with Kent Andersen I liked it because it focused on CLIL resources you can find on the web and because I could experience how to share the tasks between teachers in a CLIL team. 26 Jan - Webinar with Donatella Nucci and Max D'Innocenzo I liked it because it was about eTwinning.
The best learning material/s. Why?	All material suggested was really interesting but I liked Learning Designer very much because it allowed me to develop a few lessons in details focusing on the single steps and giving a visual scheme easy to read and understand.
Your best digital product/s within Techno-CLIL (brief description and link)	Lesson plan about road signs. The children will learn how to behave along the road, to recognize the road signs, to become aware of the rules of the road and respect them to be safe when they walk to school or when they cycle alone. http://v.gd/epCSRl

Figure 3. An example of "My experience in Techno-CLIL" form. Nicoletta Ferri's form can be found here.

Asynchronous learning can lead to feelings of isolation, if there is no real interactive educational environment. That is why the moderators decided to combine asynchronous with synchronous learning, organizing a series of webinars with experts in CLIL or CALL, so that participants could get inspiration from live learning events.

4. Synchronous activities

The main benefit of synchronous learning is that it enables students to avoid feelings of isolation since they are in communication with others throughout the learning process. Synchronous learning is not as flexible in terms of time as you have to connect at a certain time to attend a live session. In addition to this, Techno-CLIL, as a global initiative, covered different time zones all over the world. Nevertheless, webinars were greatly appreciated: they were attended by an average of 150/200 participants each time. Recordings were available soon after, so that all the participants could watch them later on.

According to Feenberg (1998), *"online learning is most effective when delivered by teachers experienced in their subject matter. The best way to maintain the connection between online education and the values of traditional education is through ensuring that online learning is 'delivered' by teachers, fully qualified and interested in teaching*

online in a web-based environment". The fact that highly-qualified experts would volunteer as speakers for Techno-CLIL was an added value for the participants and a guarantee for scientific quality and global value.

Among the well-known speakers, just to mention some of them: Gisella Langé, inspector from the Italian Ministry of Education; María J. Frígols, from Valencia University; Carmel Mary Coonan, from Venice University; Kent Anderson, editor of the CLILSTORE website; Kristina Cunningham, senior policy officer in charge of Multilingualism in the Directorate General for Education and Culture of the European Commission. Ana Gimeno Sanz, former President of EUROCALL, the European Association for Computer-Assisted Language Learning delivered a very interesting webinar on the role of digital storytelling for CLIL, reporting on a project carried out at the Technical University of Valencia, with her Aerospace Engineering students, engaged in producing digital stories for their Technical English class.

Webinars turned out to be very successful as they gave the participants the opportunity to interact with colleagues, moderators and experts through text or voice chat.

5. Main outcomes

The following comments from some of the participants collected through the final survey can summarize in an effective way the main outcomes of the course, by recalling some steps of the course itself. The participants were invited to respond to the following prompt:

Explain briefly what you have learnt from TECHNO-CLIL and what you may use in your future teaching.

> *The units of the various modules have represented a progression in CLIL understanding, starting with an introduction that explains the differences between traditional and CLIL methods in foreign language learning/teaching; the basics of CLIL, carried out through the reading of specialized texts and videos dealing with the theoretical aspects of this methodology, and finally, an account of CLIL elements and issues, leading to CLIL language identification and acquisition (CLIL glossary) and an essential competence (contents) assessment. It was a very interesting activity for me, which sparked immediate curiosity and expectations. The activity, in my opinion, has achieved a good level of personal satisfaction with the ability to address and manage a new teaching situation and was significant compared to the motivation and to learning.*

The participant has summarized the main steps of the course, expressing a high level of motivation and interest in a new teaching situation which has become a challenge for him/her.

> *Bottom line at the end of the CLIL course I have better understood and I feel able to:*

- *Break down instructions*
- *Evaluate language challenges in the classroom*
- *Use mode language*
- *Develop enquiry-based learning*
- *Increase communication in English*
- *Improve assessment methods and feedback.*

The above mentioned comment is interesting as it details the competences acquired during the course, after a self-reflection process which has led the teacher to a deep professional improvement.

> *In my working daily life this activity gave me the abilities to:*

- *Design new unit learning*
- *Use other colleagues' lessons which I considered interesting and applicable to my classes and teaching purposes*
- *Raise my ability towards the lesson planning approach of both subjects: Mathematics and Physics.*

> *Results from the work:*
> - *Satisfaction*
> - *Amazement*
> - *Fun*
> - *Change in the teaching / learning approach (more attention, interest, participation, enthusiasm, efficiency, improved outcomes …).*
>
> *Working in such a diverse group with different experience and training has been a new and exciting departure, and getting involved has enabled new insights and reflections, re-motivating also my approach to the curricular subjects I teach (Mathematics and Physics).*

The above mentioned comment is also a very deep self-reflection and meta-cognition of the learning experience, matching the competences acquired with satisfaction, amazement and fun. It is also worth underlining how different the teacher feels after this training experience: he/she has totally changed his/her learning/teaching approach and her attitudes towards the subjects he/she teaches: that was one the most challenging aims of the whole initiative itself.

> *I learned to see CLIL as an opportunity to open the door of knowledge through the English language; I discovered that on the Web there are countless free resources and tools for innovative learning (extensive reading, flipped classroom, techno-CLIL); I also found it very helpful to share my work and my opinions with adventure colleagues.*

This participant has also found a new world thanks to Techno-CLIL: a lot of resources and materials which were shown through guided web tours. What is more, the participant has discovered how important it is to share materials, ideas and resources with colleagues ("adventure colleagues" sounds funny but meaningful): a mutual enrichment for the community of peers. The peer learning experience and the sharing perspective were also among the aims of the course.

6. Feedback

The session was particularly successful: almost 5000 participants joined the Moodle platform. The feedback was extremely positive and rewarding: they were satisfied with the content and the structure of the pathway, as Figure 4 shows:
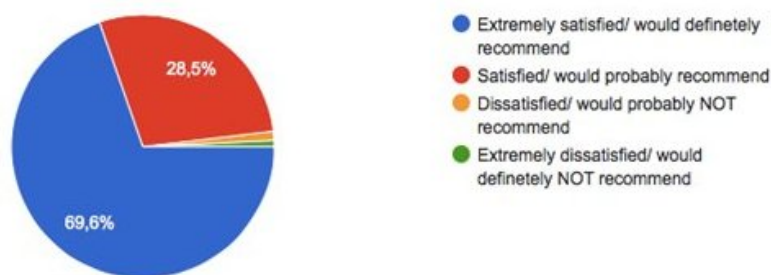
Figure 4. Overall satisfaction with the course.

The combination of the different working tools and environments was deemed positive, even if a small percentage (13,3%) of the participants got confused while switching from the Moodle platform (for the asynchronous activities) to the WizIq platform (for the live webinars), or to the informal environments such as Facebook.

This kind of feedback, however, is particularly interesting and useful, especially for the planning of the next EVO session which will take place in January 2017. It is important to consider the mixed digital abilities of the target participants, who may be not familiar with Personal Learning Environments (PLE) and Personal Learning Networks (PLN) (Chatti et al., 2010) and may get lost while switching from one tool to another or from one environment to another. A better introduction and familiarization with the working tools at the beginning of the next session would probably help.

The following hint was proposed in the final survey:

www.manaraa.com

Please rate the platforms and tools used in the session (Padlet, Wiki, Moodle, Learning Designer etc.)

- Platforms and tools were mostly easy to use/ appropriate for the session content
- Platforms and tools were mostly difficult to use/ inappropriate for the session content
- There were too many platforms and tools/ I was confused by the platforms and tools
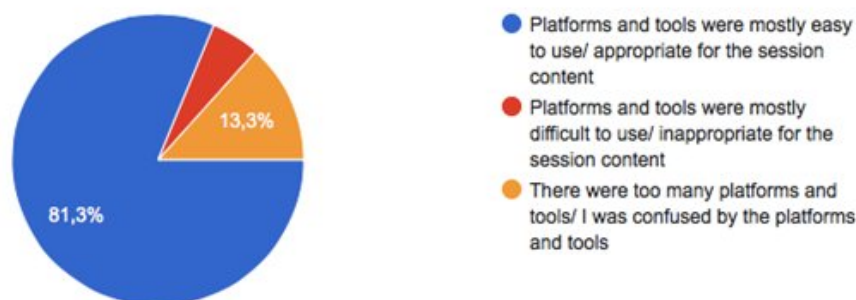
Figure 5. Platforms and tools.

In the final survey the participants were asked to imagine writing a message to a colleague, listing the reasons why he/she would/not recommend Techno-CLIL.

Below are some of the participants' messages:

> *I would recommend Techno-CLIL for the amount of reading materials offered, for the opportunity to be involved in inspiring webinars, for the web sources suggested and the technological tools shown as well. Moreover, being involved in a community of teachers whose desire to improve is at a very high level has made the course an amazing opportunity to get in touch with highly professional people. The moderators have done an amazing job, coordinating all the community involved. I now know much more about CLIL, flipped education, extensive reading and how to use the 2.0 tools. Taking part in such a course has been the most useful experience ever experienced in my teaching career on both a professional and a personal side.*

This message is very encouraging, pointing out the quality of the course but also the positive and enriching experience as a member of a community of inspired professionals.

> *It was really a great opportunity for personal and professional enrichment. It opened up a world unknown to me. I was able to learn how to plan CLIL activities in the classroom using Internet and technology 2.0. I could compare different experiences through forums, wikis, blogs and webinars discussing theory, methodology and practice of this innovative teaching method.*

This teacher stresses the innovative aspects of CLIL and the enrichment he/she could get thanks to Techno-CLIL and the different working tools proposed during the course.

> *CLIL is finally "also" an effective teaching method of a curricular discipline in English because: it allows you to learn the language more effectively and to enrich vocabulary through the contents offered by another discipline. It allows you to learn the content of the discipline through reflection on language keywords. We must be careful not to confuse the role of the subject teacher with the English teacher who remains the true language expert. Techno-CLIL is definitely good for your own culture, for the knowledge of the pupils and it is especially good for the soul of the teacher… I never felt alone on this path!!!*

This comment focuses on the definition of CLIL methodology, as the teacher conceives it: an effective teaching method which can be an added value to the teaching of a curricular subject. According to this participant, the true language expert will always be the language teacher: it is easy to understand how CLIL is a hot issue both for subject and for language teachers, although in some countries, such as Italy, the CLIL teacher is a subject teacher who has developed high language competences (C1 level according

to the *Common European Framework of Reference for Languages*) and methodological competences in CLIL after attending specific post-graduate university courses.

The following remark is particularly impressive and could be considered as a sort of slogan for the future editions of Techno-CLIL:

TECHNO-CLIL opens your mind. Let's do CLIL… you will not regret it!

7. Conclusions

The aim of this report was to present an online global training experience on CLIL and CALL carried out in 2016 within an international community of teachers, trainers and educators. Through a brief description of the syllabus and of some of the most relevant asynchronous and synchronous activities proposed during the five-week pathway, the contribution tried to show the added value of technologies when delivering subject content in a foreign language through CLIL methodology. The main outcomes of the course were also depicted by recalling some of the participants' comments. The experience represented an opportunity for professional and personal enrichment and growth for about 5000 participants, eager to experiment new tools and methods in their classes and to share their products with other colleagues from all over the world.

The road leading to good teaching practices encompasses a self-reflective and meta-cognitive process of the competences acquired and Techno-CLIL wanted to help a community of peers reach this goal. According to the participants' feedback it appears to have succeeded.

Acknowledgements

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Book review

New perspectives on teaching and working with languages in the digital era

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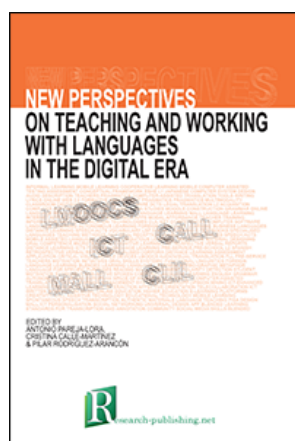
New perspectives on teaching and working with languages in the digital era

Computer technology has been used to assist language learning for a very long time. From the beginnings of Computer Assisted Language Learning (CALL), back in the 1960s, a number of technologies, usually grouped under the term ICTs (Information and Communication Technologies), have been developed and implemented for educational purposes in general and in language teaching and learning in particular. As a result, a wide range of terms have emerged, describing new educational environments and paradigms, such as e-learning, Mobile-Assisted Language Learning (MALL), ICALL (Intelligent CALL), TELL (Technology-Enhanced Language Learning), blended learning, ubiquitous learning, among many others. Along this process of technological improvement and sophistication, the wider social context in which language learning takes place has also experienced a series of complex modifications to make the learning process more learner-centred, more focused on the needs of a global world, more active and more dynamic in many respects. Two significant examples of this educational shift in the field of language learning nowadays are, firstly, the need to learn at the student's own pace, independently from time and space constraints, and secondly, the global advent of a multidisciplinary group of new pedagogical approaches, environments and

methodologies, such as the Bologna Process in Europe, bilingual education, task-based and project-based learning (TBL and PBL), competence-based teaching and many others. In such a complex and challenging educational context, ICT-based language learning and teaching becomes a much more flexible and multifaceted endeavour, where the rapid technological development should go hand in hand with careful pedagogical reflection and the integration of key didactic issues, if we want to take full advantage of the potential of ICTs in language learning. Consequently, there is a need for pedagogical research on the new scenarios brought about by ICTs when they are integrated in the language learning process. Therefore, books like this one are necessary and welcome, as they help us understand the pedagogical potential of ICTs and know how to efficiently integrate them in language learning. The book is a comprehensive state-of-the-art account of the most innovative possibilities of ICTs to build up approaches and environments to enhance the language learning and teaching processes.

At a general level, five major characteristics of the book could be considered as its strong points. Firstly, it is based on research, which provides it with a sound theoretical background. The types of research methodologies that may be encountered throughout the book are varied, but every chapter is approached from thorough investigation and reflection of the matter at hand. Secondly, it also has a practical orientation, in two basic ways: it is full of feasible teaching ideas and it incorporates lots of case studies that show the potential of ICTs in the different areas under discussion. Thirdly, it is comprehensive, since it covers the most important areas, disciplines and scenarios of the use of ICTs for language learning. Fourthly, in close relation with the latter point, the work is multidisciplinary, with a professional discussion of a broad range of disciplines, from the most technical ones (e.g. corpus analysis and interface design) to the most pedagogical ones (e.g. collaborative learning, assessment and evaluation). Such a multiple perspective results in a series of relevant insights to do with the efficient use of ICTs in language education. And finally, the book takes an integrative standpoint, since most chapters combine more than one single technology and language learning approach. This is an added value of the use of ICTs in language learning and teaching, as teachers or researchers are not limited to just one point of view, but, on the contrary, they can enhance the language learning process with the synergy resulting from an integration of multiple technologies.

Building on the idea of the interdisciplinary nature of the book, an interesting reflection comes to the mind of the reader just from its title, with its reference to "teaching and working with languages". Although most sections of the book are devoted to language learning and teaching assisted by ICTs, it also discusses at some point how communication technologies may help us in certain professions such as translation (see Chapters 30 or 31 for instance). This fact reflects the close relationship existing nowadays between learning a language and using it at work, which is particularly true in disciplines like translation studies or in legal contexts. It should be noted here that modern language learning and teaching approaches have undergone a paradigm shift towards authenticity, that is, connecting the learning of a language with what the learner needs to do with the target language (at work or elsewhere). In this respect, ICTs are ideal tools to assist these modern approaches related to learning-by-doing or life-long-learning, as can be clearly illustrated throughout the book.

This edited volume consists of 33 chapters structured in the form of research papers which deal with different areas and educational environments where ICTs and language learning and teaching merge. The structure of all the chapters is that of a research paper, including an abstract, literature review, research methodology with discussion of results, conclusions that point at possible areas of future research and relevant and updated bibliography. Thus, it somehow resembles a book of conference proceedings, which may mislead some readers. Nevertheless, the whole book has a high level of coherence that makes it look like a research handbook, with a language which is easier to understand for the general public than that commonly found in certain research papers. It provides plenty of data and examples to illustrate innovative ways of using ICTs in language learning, which is a very useful feature. The book could be also used to locate and categorize relevant literature and bibliographic references on the various topics under discussion. As regards the global structure of the book, it is divided into

three general sections. The first part (chapters 2 to 15) deals with how ICTs are normally being used in the context of language teaching and learning. This section can be further divided into three subsections: e-learning and languages in education, distance and life-long teaching and learning of languages, and, finally, interaction design, accessibility and usability. The second part of the book (chapters 16 to 26) discusses innovative trends and uses of ICTs for language teaching, and is, in turn, subdivided into three subsections: MALL, Content and Language Integrated Learning (CLIL) and computer-assisted testing and assessment. The third and last big part of the book (chapters 27 to 33) deals with the applications of language technologies, that is, how computational linguistics and computer-assisted language resources and tools can be implemented in language learning and teaching.

As shown in this overview of the book's contents, it provides an exhaustive coverage of the most recent approaches and methodologies regarding the pedagogical use of ICTs in language learning and teaching. Although each chapter deals rather specifically with a particular technological and pedagogical domain, there are certain common findings, insights and conclusions shared by many chapters of the book. In the first place, it seems that several chapters make it clear that even though ICTs have great pedagogical possibilities in language learning, they are not being used to their full potential. And this is true both from the point of view of teachers and learners. As a consequence, several papers (chapters 2, 4, 6, 7, 9 and 11, for example) agree on the strong necessity of teacher training and of working hard to motivate the students when using ICTs for the purpose of language learning. Another point made jointly by different chapters is the fact that ICTs have the most positive impact on language learning and teaching when the technology is supported by a change in the teaching methods (chapter 5), as well as based on strong theoretical grounds (chapter 20), taking into consideration the prime importance of a didactically efficient interactivity design (chapter 14) and feedback support (chapter 25). A third coincidence found throughout the pages of the book has to do with eclecticism and the added value of mixing up in a coherent way not only different technologies in a given learning context, to avoid the limitations of using a single technology (see for instance chapters 10, 12, 15, 18, 19, 21 and 22), but also integrating different educational purposes within a given technology. On the other hand, several chapters of the book illustrate well how ICTs can efficiently be of use in areas of language learning that are of prime importance and have been often ignored by educational technology, such as oral skills (chapters 7 and 21) and pragmatics (chapter 12), for instance.

As Jordi Adell puts it on several occasions, including his personal website (http://nti.uji.es/~jordi), technology in education should be used either to allow us to do things that were not available to us in the past, or to help us to do in a better way what we did without full satisfaction. The book is full of examples of such a pedagogically relevant use of ICTs in language learning. An example of the former possibility (technology to carry out tasks that were not possible before) can be found in chapter 10, with the integration of telecollaboration via Skype and autonomous learning through language MOOCs, or in chapter 28, in the case of automatic processing of opinions. Examples of the latter possibility (to do old tasks in a more effective way by using ICTs) can be illustrated in chapters 24 and 25 (improvement of language testing) or in chapter 30 (error detection), among many others.

In summary, the book *New Perspectives on Teaching and Working with Languages in the Digital Era* is an updated record of the best use of ICTs in the field of language learning and teaching at present and it can be extremely useful at three basic levels. First, teachers will find examples of best practice along with practical teaching ideas and approaches when incorporating ICTs into their classes. Second, the book can also be useful for dynamic learners in search for new ways to improve their language learning processes. And last, but not least, it can be a valuable tool and resource for language learning researchers, to get an overview of state-of-the-art insights into the use of ICTs in language learning.

Recommended website

Lingora

Edmund Hutchings

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contact@elingora.com

Lingora is an online language learning community for intermediate to advanced learners. People who want to improve at speaking the languages they study can receive written and audio recorded feedback about their accent, pronunciation, intonation and accuracy from native speakers.

Each week language learners add audios of themselves speaking the language(s) they learn by carrying out tasks which are sent to them by email. Below, in Figure 1, a Portuguese native speaker reads out a text in English. English native speakers subsequently listen to the text and then decide how good each individual element of speech is by using a five-star rating system. Most significantly, they give the speaker custom feedback for the student to act on in the form of comments. On a weekly basis, language learners receive reminder emails to prompt them to act on the advice they get.

English Challenge

The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite, a set of communications protocols, to serve billions of users worldwide. The internet has reshaped and redefined most traditional communications media including telephone, music, film, and television. This has given birth to new services. Newspaper, book and other print publishing are adapting to Web site technology, or are reshaped into blogging and web feeds.

The Internet has enabled or accelerated new forms of human interactions through instant messaging, Internet forums, and social networking. Online shopping has boomed both for major retail outlets and small artisans and traders. Business-to-business and financial services on the Internet affect supply chains across entire industries.

The origins of the Internet reach back to research of the 1960s, commissioned by the United States government in collaboration with private commercial interests to build robust, fault-tolerant, and distributed computer networks. The commercialization of what was by the 1990s an international network resulted in its popularization and incorporation into virtually every aspect of modern human life. As of 2011, more than 2.1 billion people — nearly a third of Earth's population — use the services of the Internet

Source: Wikipedia

Figure 1. Audio recording produced by a language learner.
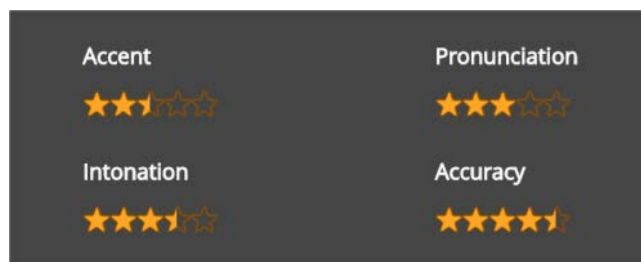
Figure 2. Five-star rating system.
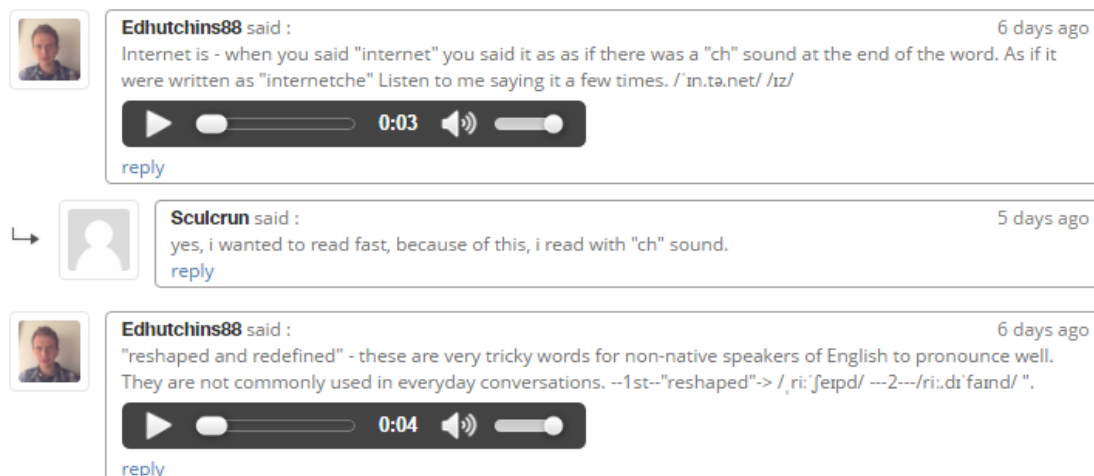
Figure 3. Rating example.

When we speak other languages, we are always keen to get constructive criticism from native speakers, so we can learn exactly how we can make progress with our accent, intonation and pronunciation. The *very* best way to do this is to interact with them as much as we can and (if conceivable) go and live in the country where the language is spoken for as long as possible.

However, what we have found is that when language learners speak to native speakers in their language(s), native speakers do not always correct the learners' mistakes and give them detailed, documented feedback about what they need to do to improve. We believe that this is because native speakers often do not want to interrupt learners when they are speaking about something, as this could discourage them from expressing themselves.

Lingora believes that language students simply cannot just rely on speaking as much as possible with native speakers when learning a language. It is vital to ensure that native speakers are correcting learners and telling them specifically how they can improve. Take a look at the experience of one of the creators of Lingora:

> Edmund
> *I am a 27-year-old native English speaker and an avid language learner. When I was doing language exchanges in Spain and Uruguay, I spoke Spanish all the time and as time went by, I thought I was beginning to speak it perfectly. However, when I really pushed native speakers to give me feedback, I found numerous things I needed to improve at in terms of my pronunciation, accent, intonation and accuracy in the Spanish language. I wished that there was a community specifically for both storing and sharing these valuable feedback points and ensuring that I acted on them.*

One could argue, however, that the speech in these recorded files is not spontaneous and often involves language learners just reading out texts and that it would, therefore, be better for language learners to record live conversations they have with native speakers and then receive the necessary feedback. Although reading out a text and getting feedback from native speakers is useful to a certain extent, it is not the same as communicating live with native speakers. That is why Lingora is encouraging a new

initiative with Teentok. With Teentok, a learner can watch videos containing highly relevant role plays for everyday situations. For example, speaking to someone about what's for dinner tonight. It works as follows: The learners watch the video(s) a couple of times to familiarize themselves with the dialogue and see how much of the meaning they can guess on their own. Then they work though different versions of the dialogue which help them understand more precisely what the characters are saying. As they progress through the videos, they gain a pretty good understanding of the dialogue even if they don't understand every single word, and work on their pronunciation. By watching each of the successive versions and exercises, they end up memorizing most of the content in the dialogue.

The following step is to practice these role plays studied on Teentok with a native speaker. Using Skype, learners will practice the role play they watched on Teentok, but this time with a native speaker. The role plays are recorded and then uploaded to Lingora. Native speakers subsequently rate these audio exchanges in terms of accent, pronunciation and accuracy, and provide specific, audio recorded and written comprehensive feedback about how learners can improve when speaking their language.

Lingora ensures learners act on the feedback received so that they gain confidence when communicating and find (just after a few weeks of using the Teentok and Lingora method) that their speaking skills have improved and are producing language more clearly, fluently and confidently. At the moment, however, this feature is only available for English language learners, but over the coming months, the company hopes to make it available for many more languages.

Regarding how the platform ensures that the language learners act on the feedback, currently, they receive a weekly email to do the following:

1. Remind them of all the tips and hints native speakers have given them about what they need to do to make progress with the language(s) they learn.
2. Prompt them to log back into their Lingora account on a regular, weekly basis to review the comments.

Nevertheless, this is an area that the company aims to improve and is working on in order to provide language learners with flashcards – which contain the feedback they receive from native speakers, ensuring they remember and retain it. This will be ready within the next few months.

The process of rating language learners' audios and posting comments on them is straightforward and so is the process of adding an audio on Lingora. Providing the language learner is using Mozilla Firefox or Microsoft Edge (on Windows 10) as their web browser to use Lingora, they can use Lingora's built-in media recorder. This means that they do not have to leave the platform, when adding their audio, involving fewer clicks and fiddling around. However, if the user does not wish to use Mozilla Firefox or Microsoft Edge, they can use another program to record themselves speaking and then upload the file. This could be an alternative online voice recorder or an app on their phones. Within the next couple of months, Lingora's built-in media recorder will work well on Google Chrome. In the future, the company will also be releasing phone applications (for iOS & Android devices) which will make the process of adding audios even simpler.
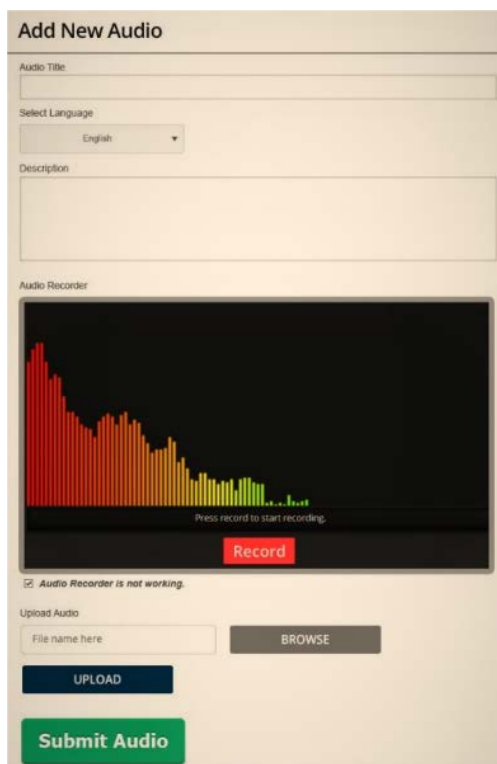
Figure 4. Adding an audio.

In terms of keeping track of their progress (i.e. how many audios they have added, how much feedback they have given to others, etc.), all users are provided with a profile page in Lingora so they can keep track of their performance and review the audios they have added, for any of the languages being learnt. The following is an example profile page:
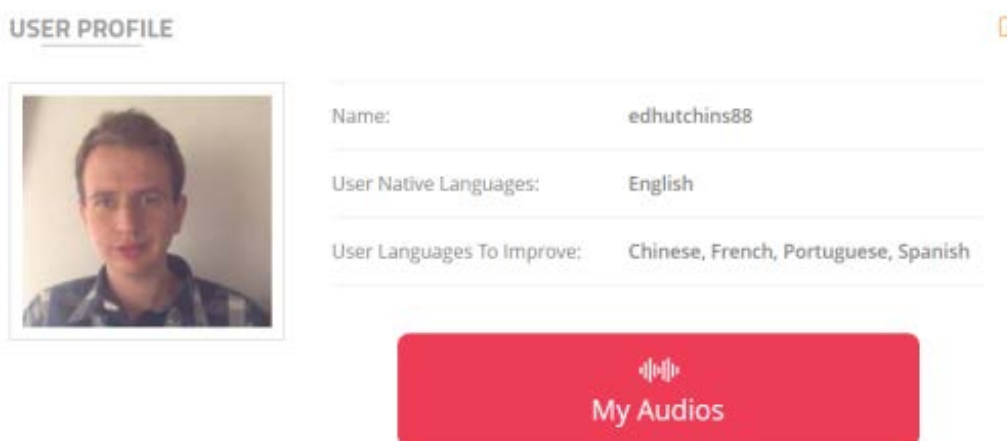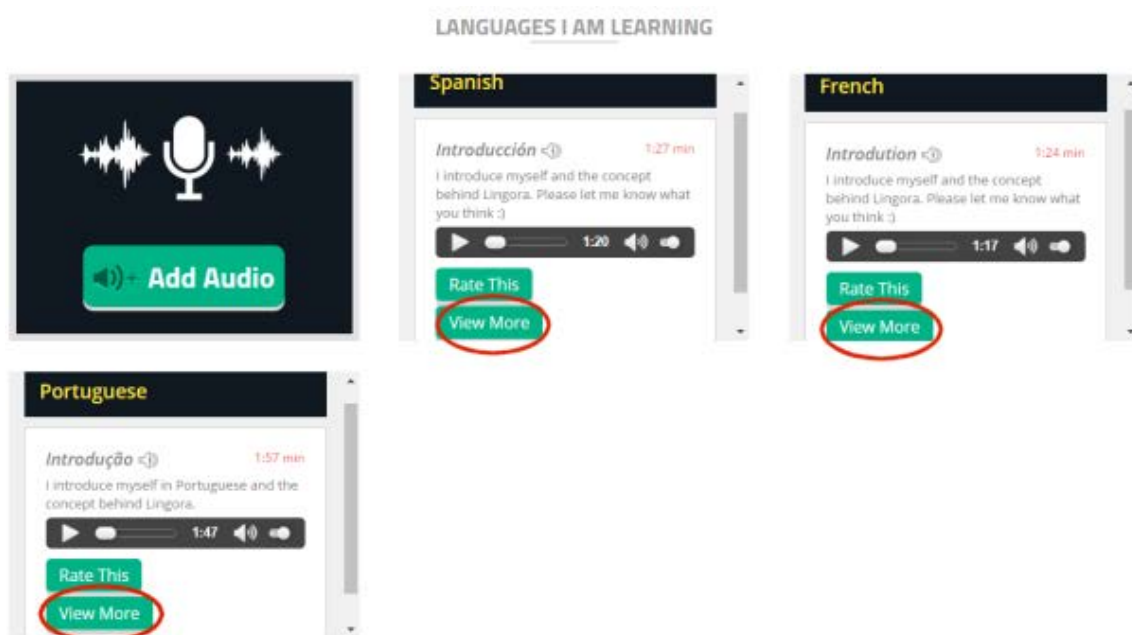

Figure 5. Sample profile page.

Figure 6. Display of uploaded audio files for a given language.

Once a user clicks the "view more" button on a language they are learning, they are able to see all the audios they have added in that language.
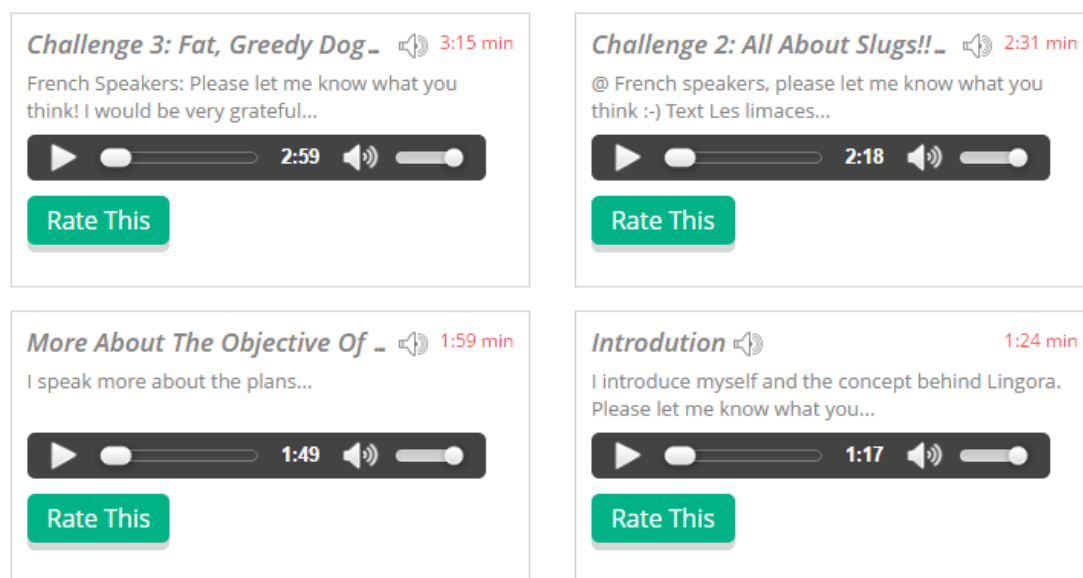
Figure 7. Example of "view more audios".

Lingora will be free forever for the students that use it, regardless of the number of new features that are added. Having said that, because many language learners like to spend time having a lesson with a qualified teacher with unique, custom methods to help them make progress (owing to the fact that they may need more detailed, immediate help with their writing and grammar, before an important exam, for example), in the future, language tutors will be able to advertise their services on Lingora for a (monthly or annual) fee. One thing all of the members of the Lingora community have in common is the desire to improve at the languages they learn, so this ensures language tutors have the right target audience to promote their services to.

Lingora was built using Drupal, an open source, content management system. Like Lingora, Drupal is built on principles like collaboration, globalism and innovation. It is distributed under the terms of the GNU General Public License (GPL).

Editorial Board

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If you can provide information on any topic of interest to the CALL community, please send this directly to Ana Gimeno, email agimeno@upvnet.upv.es

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