A Collaborative Vocabulary Notebook as a Complementary Tool to Language Courses at the University Level

Mathieu Loiseau[2][a], Émilie Magnat[3][b], Sébastien Dubreil[4][c], Enzo Simonnet[1,2][d] and Élise Lavoué[1,2][e]

[1]*Université Jean Moulin Lyon 3, IAE Lyon School of Management, Lyon, France*

[2]*Univ Lyon, INSA Lyon, CNRS, UCBL, LIRIS, UMR5205, F-69621, Villeurbanne, France*

[3]*Université Lyon 2, Laboratoire ICAR UMR 5191, France*

[4]*Carnegie Mellon University, Dietrich College of Humanities and Social Sciences, U.S.A.*

Keywords: Vocabulary Learning Tool, Collaboration, Teaching Practices, Hybrid Learning.

Abstract: While essential to second language learning, vocabulary learning is a complex and time-consuming task. It rarely takes place explicitly in classrooms and, consequently, learners are often expected to carry out this activity autonomously. Many tools targeting vocabulary learning exist, but they are frequently conceptualized as stand alone products, leaving little room for integration within institutional curricula and collaboration between learners. In this paper, we present a shared vocabulary notebook tool to enhance vocabulary learning in and outside the classroom. This tool was designed according to an iterative and participatory process to integrate both learners' and teachers' needs. In 2024, we conducted a 6-week study in 4 classes of French L2 learners at Carnegie Mellon University. We explored both learners' and teachers' uses and perceptions of the tool. We cross-checked interaction traces to qualitative outputs (i.e., focus groups carried out with the learners and interviews involving participating teachers). We present results regarding the integration of the tool in teaching and learning practices, the expectations and apprehensions linked to the collaborative and social dimensions, and the limitations of a stand-alone vocabulary notebook tool. Our findings have broader implications for the community as regards the design of tools to support vocabulary learning.

1 INTRODUCTION

Vocabulary learning is an essential dimension of foreign language learning (Jiang and Liu, 2024; Nation, 1999). While some go as far as arguing that developing enough vocabulary is "pre-conditional for successful language learning" (Agustín Llach and Canga Alonso, 2020, p. 2) others call vocabulary a "good predictor" of global communicative skills of the students (Lindqvist and Ramnäs, 2017, p. 57). However, the communicative approach had all but put lexicon learning out of the scope of good language teaching practices (Hilton, 2002, § 39). With the advent of Task-Based Language Teaching (TBLT) and of the Common European Framework, explicit work targeting the lexicon is no longer frowned upon (see (Council of Europe, 2000, § 6.4.7.1.)).

Still, TBLT hardly gives insight on how to handle vocabulary, it is "assumed that second language (L2) vocabulary [will] take care of itself" (Schmitt and Schmitt, 2020, p. 32). In this context, vocabulary learning, and its methodology, is often carried out without the supervision of the teacher: as Lindqvist and Ramnäs explain it (for the case of Sweden) though vocabulary is not taught, it cannot be said that it is not learnt (Lindqvist and Ramnäs, 2017, p. 59). Indeed, the mastery of the necessary few thousands words[1] has to be acquired in a large part autonomously, outside the classroom. Indeed, many studies highlight the need to encourage independent and autonomous learning (Ginanjar Anjaniputra and

[a] https://orcid.org/0000-0002-9908-0770
[b] https://orcid.org/0000-0001-8857-9405
[c] https://orcid.org/
[d] https://orcid.org/0009-0000-9740-5212
[e] https://orcid.org/0000-0002-2659-6231

[1]Some 3000 families of words, at least, are required to communicate in a foreign language (Laufer, 1992).

Loiseau, M., Magnat, É., Dubreil, S., Simonnet, E. and Lavoué, É.
A Collaborative Vocabulary Notebook as a Complementary Tool to Language Courses at the University Level.
DOI: 10.5220/0013428700003932

In *Proceedings of the 17th International Conference on Computer Supported Education (CSEDU 2025) - Volume 1*, pages 555-564
ISBN: 978-989-758-746-7; ISSN: 2184-5026

Salsabila, 2018; Farangi et al., 2015).

Numerous Technology-Assisted Vocabulary Learning (TAVL) tools[2] have been developed and have shown positive impact on learning processes, particularly concerning new vocabulary (Hao et al., 2021). However, these tools have shown certain limitations when used autonomously by learners. Based on a review study on TAVL, Klimova suggested such applications should be used in a guided and controlled context to lead to a more effective learning process (Klimova, 2021). Therefore, involving the teacher in the learning process appears as a key element to ensure that students learn vocabulary efficiently outside the classroom. Yet, the question of how to best harness TAVL resources in language learning "is still in its youth, but is likely to become a major focus of research in the coming decades" (Schmitt and Schmitt, 2020, p. 25).

In this context, the Lex:gaMe project aims to develop a personalized digital vocabulary learning environment that provides affordances for vocabulary learning both inside the classroom and outside the classroom. One of its main objectives is to make the link between the two learning situations explicit and provide both learners and teachers control over the content. The first building block of this learning environment, called BaLex, is a shared vocabulary notebook that was created according to an iterative and participatory design process.

Despite its design process involving both teachers and learners, a first study highlighted Schmitt's remarks: teachers did not integrate BaLex in their practices (Driediger, 2024) and learners even less so.

In this paper, we take a step back and follow more closely the way BaLex can be integrated into a daily language teaching and learning practices, both on the teacher and learner's side. We present a case study carried out with 6 groups of French students at the Department of Languages, Cultures and applied Linguistics at Carnegie Mellon University (USA). Beyond feedback on our own tool, this study means to provide insight as to the factors of successful integration of TAVL tools in classrooms.

To ground this study, we first provide a theoretical background on vocabulary learning and identify the specific challenges that arise. We review existing TAVL tools to identify relevant functionalities, as well as limitations. We then present BaLex, before focusing on the case study: we analyse both quantitative and qualitative data on learners' and teachers' uses and perceptions of BaLex, and draw recommendations regarding the design and integration of tools to support vocabulary learning.

[2]Although the acronym TAVL is not widely used, we believe it makes a logical addition to Mobile-Assisted Vocabulary Learning (MAVL) (Ye et al., 2023; Ma, 2017) and Computer-Assisted Vocabulary Learning (CAVL) (A. Al-Jasir, 2019). It is noteworthy that the expression "Technology-Assisted Vocabulary Learning" has already been used in (Hao et al., 2021).

2 THEORETICAL BACKGROUND

2.1 Vocabulary Learning

"Vocabulary" refers to the set of words known by an individual (in reception or production); it represents a subset of the lexicon. The term "lexicon" refers to all the lexical units of a language. This goes beyond the mere notion of "word". In fact, the lexicon is made up of different types of "lexical entities" (Polguère, 2019). Though vocabulary learning has often been linked to making associations between a word form in L2 and a first language (L1) counterpart (Oxford and Crookall, 1990), this is a more complex process. Indeed, knowing a word involves many aspects of the lexicon that could be grouped into three categories (Tremblay and Anctil, 2020, fig. 1): form, meaning, and use (Nation, 2013, p. 49). Each category encompasses both productive and receptive knowledge. Form designates the oral and written forms (spelling, sinograms) of the word but also its morphology. Meaning deals with associating a concept to a word form or finding a word form to designate a concept but also addresses polysemy and associations to the concept/word form. Finally, "use" (or "combining" for Tremblay and Anctil) covers grammatical functions, collocations and constraints on use (register, frequency, style, connotations, etc.). The notion of lexical competence, also encompasses the attitudes towards vocabulary learning (Tremblay and Anctil, 2020). This dimension known as "word consciousness" is defined as "interest and awareness in words" (Scott and Nagy, 2009, p. 127) and, as such, also comprises a form of knowledge.

Since one type of activity cannot address all aspects of vocabulary learning, a wide range of learning activities can be found in literature. The importance of teachers considering individual learning styles is emphasized by Oxford and Crookall (1990), particularly in the context of vocabulary learning. For them, teachers should acquaint themselves with diverse vocabulary instruction tools and integrate training on these tools into regular classroom activities. Teng concurs and argues that teachers need to help students develop the depth and size of their vocabulary knowledge by devoting time to teaching some vocabulary-learning strategies (Teng, 2014).

2.2 Technology-Assisted Vocabulary Learning

Many TAVL tools have been developed over the past two decades to support vocabulary learning. In a 2022 meta-analysis examining the effectiveness of such technology, 34 studies with 2,511 participants yielding 49 separate effect sizes were analyzed. The meta-analysis identified a moderate overall positive effect size for using technology to learn L2 vocabulary (Yu and Trainin, 2022). With a similar scope, a meta-analysis of 45 studies conducted between 2012 and 2018 on TAVL for English as a Foreign Language (EFL) learners found an overall large positive effect of TAVL, compared to traditional instructional methods (Hao et al., 2021). Specifically, MAVL has consistent results with the previous analyses: in 33 studies carried out between 2005 and 2018, an overall positive and large size effect on L2 word retention has been found (Lin and Lin, 2019).

Beyond the tools themselves, a way to enhance learners' acquisition in vocabulary-centered tasks is to offer collaboration opportunities (Laal and Laal, 2012). Collaborative tasks are in line with the principles of TBLT and might foster "word consciousness." In a meta-analysis we conducted, however, only 17% of the TAVL tools incorporated collaborative features (Simonnet et al., 2025).

Finally, we observed that few tools specifically either include the teacher in the learning process or ensure that students learn vocabulary efficiently outside the classroom. Indeed, only 26% of the tools integrated teachers functionalities (and less than half of these tools allowed the teachers to specify the content) (Simonnet et al., 2025).

3 BALEX

To address the aforementioned limitations of existing tools for supporting vocabulary acquisition, we propose BaLex, a collaborative vocabulary notebook designed to 1) bridge in-class activity and out-of-class autonomous learning by relying on user-generated lexical input, and 2) facilitate collaboration between students through dedicated functionalities. The first objective highlights the need for teacher involvement. The second means to encourage learners to take an active part in vocabulary learning while seeing the task as a "team sport", receiving the necessary support and guidance from their teachers. Teachers, indeed, are given the functionalities to play a central role in guiding learners, monitoring progress, providing feedback and giving instructions on the ways of using the tool.

To explicit how we tackled these objectives in our design of BaLex, we describe its main features in this section.

3.1 Lexicons

BaLex organizes lexical knowledge in vocabulary notebooks (Nation, 2013, p. 140), we refer to as "lexicons". By default, learners have access to an individual (and private) lexicon. Users can subsequently create or join groups, each group manages its own shared lexicon.

Each lexicon is associated has a home page with the same features (see Fig. 1). It allows teachers and learners to sort, organize and manipulate large lexicons, displayed as lists of words. Users can sort the entries (by alphabetical, addition date, or random order). For each entry, users can toggle a quick view of the word's definitions. They can also select entries and perform actions on the selection: export the selection of words into a different lexicon, delete them, mark them as known (🟢) or not yet known (🟡), and apply labels and deadlines.

Labels enable users to list entries according to various criteria, in the form of tags attached to a word and providing information about it (e.g. the labels Animal, Travel, Feeling, etc.). Labels thus serve both organizational and learning purpose. By creating their own labels and applying them to words, learners might gain knowledge about the meanings of the words they are labeling. Moreover, they can get an understanding of the concept of polysemy. Labels consist of several parameters: a name, a type (general or milestone), a category of users that can access it (personal, group or public).

The general labels are added by users, they can have a "universal" scope (e.g., Sport, Animal), a scope specific to the label's creator (e.g., Words that sound good) or a scope specific to a group (e.g., Words we laughed about). The deadlines operate similarly to general labels, but they also require a date specified by the creator (e.g. {Next class, 05/01/2025}, {Final exam, 20/03/2025}). When the date is reached, a dialogue box asks the label's creator whether they want to delete or renew it (in which case, a new date is requested).

The owner parameter determines which users have the right to modify the label. There are 3 different modes:

- Personal Labels correspond to a unique user who has exclusive access to it (rights to view, modify, use, delete).
- Group Labels are accessible by a unique group and only group members can access them. This

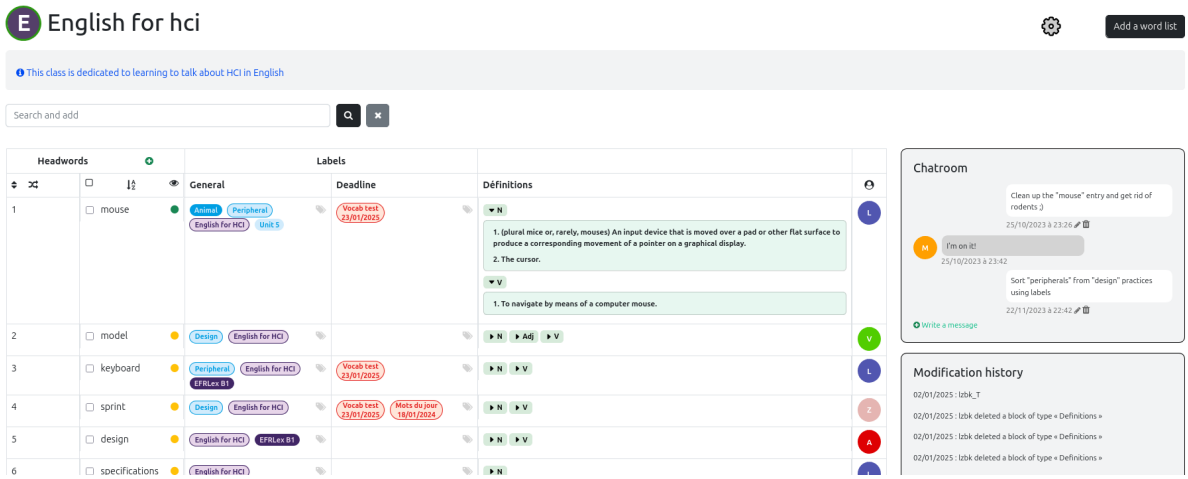

Figure 1: An example of shared lexicon. At the top, the bar allows users to search for a word in their lexicon. If not found, BaLex will look for it in the Wiktionary. Words can be sorted. Toggle buttons display definitions without having to change pages. The button at top right allows users to add word lists directly.

type of labels can allow teachers to mark some words with useful information for the students, such as with a label "For the project" or "False cognates."

- Public Labels are available to all BaLex users and everyone has access to them. For critical actions, such as deleting or renaming the label, an "approval" vote is initiated before making the change. Every BaLex user can participate and vote "In favor" or "Against" the action.

On the lexicon main page, users can look up words in the search bar. It will check whether the word already is in the lexicon, if not it will propose to add it. They can also add a whole list of words, which may be more convenient for teachers, by copying and pasting a list in BaLex or typing an entire list before asking BaLex to look them up. For every word in the list, the software looks for the word in the Wiktionary and imports/creates the corresponding entry. The lexical information is extracted from the Wiktionary and a copy is stored in the application database using Python scripts that automatically retrieve and structure it. Each language has its own Wiktionary with its own structure and templates (we currently process the French and English Wiktionaries). Users can then consult the entry and modify all the information: add, remove and reorder pronunciations, parts of speeches, definitions, examples, sub-definitions and sub-examples.

3.2 Collaborative Features

BaLex defines three distinct levels for organizing lexical data. The primary lexical database encompasses reliable information extracted from the Wiktionary in the corresponding language. At the group level, collections are dynamically managed by a student group (such as class lexicons or work group lexicons), with or without a supervising teacher. Additionally, users have their own personal lexicon.

Anyone can create a group and invite new members into the group (and its associated lexicon). The creator of the group is initially the sole administrator of the group. In order to simplify rights management, 3 roles have been designed (higher roles also encompass the rights of lower roles):

- *Administrator*: change the role of other members (including administrator). Open the lexicon for modification by all members for a specified period (e.g., 2 hours or 2 weeks)[3].
- *Contributors*: invite members, modify the lexicon, and comment on entries.
- *Readers*: consult entries, sort lexicon, select and export entries.

The collaborative lexicons each contain a discussion zone enabling members to interact, either horizontally between learners to share tips, discuss the work to be done or discuss casually, or vertically from teachers to learners to share instructions, advice and feedback (cf. fig. 1). Comments can be added to any lexical information on the entry page to encourage discussion between learners in a same group or to give feedback and indications (cf. fig. 2).

[3]For instance, teachers can use it for a classroom work session or homework.

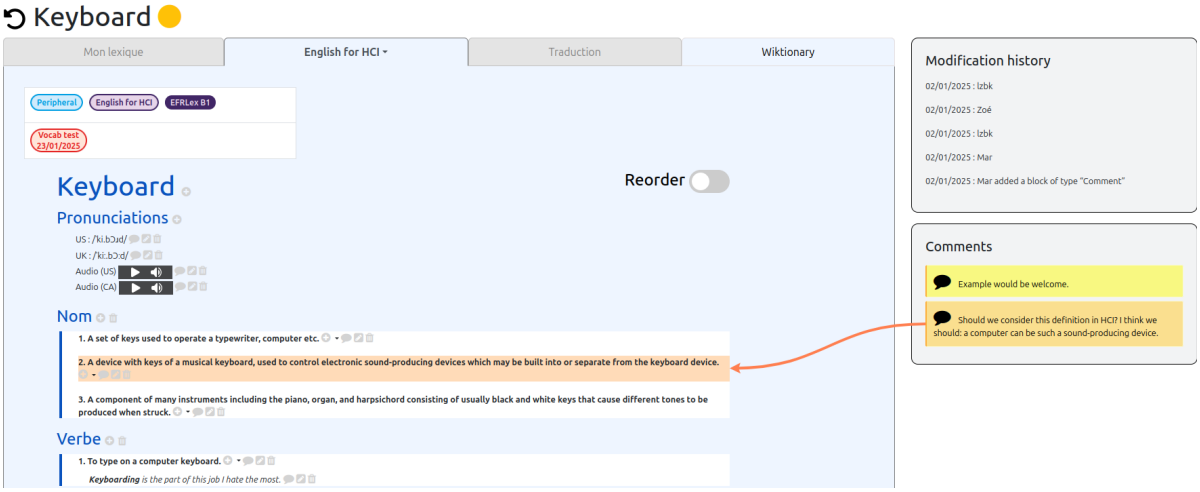

Figure 2: An example of entry. Top left, the icon returns to the lexicon. Learners can click on the orange dot to turn it green (if they know the word). Labels are displayed above pronunciations, then parts of speech with their definitions and examples. Each element can be modified, commented, deleted or added.

3.3 A Scenario

As a conclusion to this section, we tried to chose screenshots that would elicit a potential scenario for BaLex use. In this case, students are participating to a specific class targeting the use of English for Human Computer Interaction. All students participating to the class are given access to a shared lexicon. The teacher decided to pre-load a set of entries using the ”add a word list” button (cf. § 3.1). The teacher also indicated that a test was coming and labeled the words to learn for that situation (cf. fig.1). To prepare learners for their work, the teacher gave a few tasks in class: remove vernacular senses for entries such as mouse. “M” takes over the task (*chatroom* fig. 1) and did it as can be seen in the quick view of the definitions. To perform the task, they had to understand each definition before deciding that it was linked to HCI or not and thus was made aware of the many senses associated to the same entry.

After the next class the teacher gives a new task which is to add labels to entries depending whether they describe peripherals or design practices. To perform the task learners need to understand the concept behind each word. While doing so, “Mar” realizes that the musical keyboard might also be relevant for HCI and adds a comment in the entry page (fig. 2). While doing so she realizes she has a good understanding of the concept and turns the yellow circle to green.

This scenario is by no means exhaustive — even without considering the eventual catacreses (Béguin and Rabardel, 2000) that will come with the intensive use of any technological artifact —, but gives an oversight of the main functionalities.

4 STUDY ON THE USES AND PERCEPTIONS OF BALEX

To analyze how users, both teachers and learners, perceive the introduction of BaLex, we conducted an ecological study at Carnegie Mellon University in early 2024 over a period of 6 weeks. We explored the uses and perceptions of BaLex, both by learners and teachers, in the context of their French classes. We first describe the design before reporting detailed results in next section.

4.1 Design and Participants

This study was a quasi-experimental design mixing quantitative and qualitative data collection. This design was selected to observe uses and collect qualitative data on a low number of students. Participants were adult university students at Carnegie Mellon University attending French classes. They were recruited in the classes of the teachers that had previously agreed to take part in the experiment. The experiment involved four teachers and six different classes:

1. T_1 had one face-to-face class of 8 advanced level students and one face-to-face class of 8 intermediate-level students;
2. T_2 had one face-to-face class of 13 beginner level students;

3. T_3 had two online classes of beginner level students, the first class had 47 registered students and approximately 20 recurrent participants in the weekly video-conference class, the second class had 27 registered students and approximately 12 recurrent participants in the weekly video-conference class;
4. T_4 had one face-to-face class of 7 intermediate-level students.

The subjects are overwhelmingly female ($> 70\%$). Face-to-face classes had a mean age of 20 years old whereas the remote class had a mean age of 50 years old. All participants are native English speakers with the exception of 1 native Chinese speaker that had an advanced proficiency level in English.

4.2 Instruments and Data Collection

We collected several types of data:

- *User traces*: Lexicon and entry views were logged, as well as the addition of an entry to a lexicon or of a label to an entry. Each modification to an entry was also the object of a log.
- *Logbooks*: Teachers were asked to fill an online logbook after each class.
- *Interviews*: semi-directed interviews were conducted with T_1, T_2 and T_3.
- *Focus group*: 6 students from T_1's Advanced level class participated to a 30 minutes focus group.

4.3 Experimental Protocol

For each group, the experiment was launched during the second class of the semester. We visited the class and gave a 10-minute introduction to the BaLex environment. Then, students were asked to fill the pretest questionnaires. Based on the pretest[4], accounts were automatically created and a connection link was sent to each student by e-mail. From then on, the students were free to use the tool at will. We simply recommended a frequent use, if possible a dozen minutes per day. The research was carried out over the course of 6 weeks.

Teachers were also provided with an account and were recommended to include the use of BaLex in their teaching practices. We co-designed with each teacher a specific pedagogical scenario before the start of the experiment.

[4]E-mail addresses were collected at the end of the pretest. The pretest survey analysis is not part of the scope of this article.

Indeed, depending on the level of proficiency of the students and on the practices of the teachers, different approaches were considered. Some teachers (e.g. T_4 or T_2) preferred adding entries themselves and let the students work on the entries, while others (such as T_1) wanted their students to create the entries themselves based on their needs in the preparation of the final task.

Information about the experiment was available on the Learning Management System (LMS) used for the courses. It was clearly indicated that participation to the experiment had no influence on their curriculum in terms of penalties or bonuses during the semester.

5 RESULTS

5.1 Sample Description

In fig. 3 we display the logs of the students' engagement with lexicon entries. Each "log" is an action of a member of the group directed towards an entry (view, edit, label action).

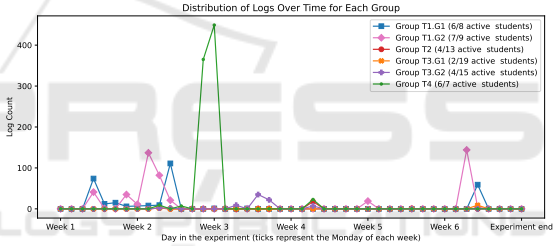

Figure 3: Distribution of logs over time for each groups.

To understand better fig. 3, we should provide insight on the number of students engaging with the entries. Despite working with small groups, no class had all students engaging with the entries. In proportion, distance students engaged less in the tasks than the face-to-face students. This was expected: T_3 explained that distance students were mostly adults taking a language module, while face-to-face students integrate French classes in their degree. In T_3's group 1, most students did not even log in once. But that was also the case in T_2's class.

In most groups, students engaged with the system "in peaks" that directly followed or happened during a class. The distribution of these peaks failed to display regularity in the activity of the learners. Furthermore, the students in the focus group admitted spending a maximum of 30 minutes in total on BaLex over the course of the experiment. In order to better understand these activity peaks, we relied on teacher data. We analyzed the 13 logbook entries

filled, mainly at the beginning of the experiment[5], with post-experiment interviews.

5.2 Integration into the Course

As mentioned in section 4.3, teachers did not integrate BaLex using the same usage scenario. In this section, we describe the regularities and differences between groups.

5.2.1 Presentation of BaLex to the Students

The tool was only demonstrated once at the end of one of the first classes (to show how to add words, comments or change definitions)[T3-logbook]. At the start of the course, the teachers told the students that BaLex was a tool for them to work on vocabulary. This was at a time when there were already "*a lot of things to put in place*"[T2-logbook][6]. It was mainly during the first and second classes that the teachers mentioned BaLex, they hardly ever did so during the next classes[logbook]. The mentions of the tool are mainly explanations of the experiment (visit by the researcher, survey to be completed, encouragement to use it) or response to student questions. Teachers were regularly asked questions about BaLex's use by learners[interviews+logbook]. Learners would also have liked a tutorial when they first logged on[interviews].

The fact that teachers were asked about the tool could be interpreted as a link between the teachers' supposed adoption of the tool and the learners' intent on using it. We elaborated on that assumption in section 5.3.

5.2.2 Modalities

While T_3 displayed awareness of TAVL in the classroom (mentioning the use of such tools as WordReference, Linguee, Reverso and Duolinguo School), other teachers did not mention such experience. T_3 is also the only teacher who declared dedicating time to using BaLex in class. She showed how to add words or comments, and how to modify definitions [Logbooks].

All teachers mentioned BaLex explicitly at one point or another. Some mentions concerned the tool in itself. T_3 reported discussing the tool in class because, in her opinion, the students had not used it enough. They therefore discussed how and why to use it.

All teachers but T_4 gave explicit out-of-class work involving BaLex, *i.e.* in addition to the general instruction to use the system for new words. But they only did so once per group during the experiment [logbooks]. T_3 asked "*to define the words [...] added to BaLex after the lesson [or] to add words to our class lexicon and their personal lexicons and that we would discuss them next week*"[Logbooks]. For his part, T_1 asked learners to make the link between BaLex and the Slam workshop they were attending ("*As you enter the Slam workshop, add the words you discover/search for to your BaLex lexicon*").

T_1 added entries but did few modifications to said entries himself, mainly watching learners' activity through the history of modifications. He checked the work done by the learners, mainly by looking at what had been added. The majority of teachers indicated that they had not added words to the lexicon themselves. On the contrary, T_2 added lists of predefined words in preparation for the next lesson, and, T_2 and T_3 both added words in preparation for the next lesson and the words that had emerged during interactions with their students. In most cases, the teachers expected learners to add new vocabulary to the group lexicon after each class.

However, in order to initiate the practice among learners, it seems important for the teacher to set an example.

5.3 Influence of the Teacher's Action

In group T_3_G2 there were very few learner actions, if any, outside of week 3 and 4, when there were many logs (up to 35 per day). It was also during this period that the teacher indicated in the logbook that she had shown the class how to add words and had led a discussion on why to use the tool. During that period T_3 added 9 words that had emerged during the lesson to the group lexicon. One learner added 5 words to the group lexicon and 22 entries were added to personal lexicons (4 of these entries came from the group lexicon).

In much the same way, analysis of the logs in T_1's groups reveals a common period of high connection (Weeks 1 & 2 and Week 6). The first peak (Week 1 and 2) corresponds to the presentation of BaLex in class and the first week of work. Week 6 peak corresponds to his mention of the creative part of the semester starting, and the slam workshop (see above).

The influence of the teacher's action on the logs can also be seen in T_4's class. During week 2, she asked the students to clean up 15 entries each week and add the "cleaned" label to those entries. That resulted in the addition of roughly 600 entries. During the class of week 3, she had "*a discussion with the students (for 20 minutes, too long!) because they had*

[5] out of the 42 classes that took place during the experiment

[6] "*All testimonies present in the analysis are identified like this*"[source]

questions about BaLex"[logbook]. Following that discussion, she reduced the instructions to adding 1 entry per week per student. The learners in this group then stopped using the tool altogether. It should be noted here that the teacher said that she did not check what the learners were doing on BaLex [logbook].

Learners underlined the importance of teachers instructions: "*[we only used BaLex] because we were told to*"[focus group], while another said "*I didn't add anything but I thought about adding.*" The incentive provided by teachers instruction should ensure that the task is short enough not to discourage the learners. Teacher contribution might also be an incentive for learners to engage in the vocabulary work.

5.4 Teachers' Difficulties and Usefulness to Students

It is important to point out, however, that the teacher contributions might be hindered by technical difficulties. Some teachers stated that they had difficulties with the tool during the experiment. T_2 indicated, for example, "*not knowing how to add words (singular, without article), not being able to add word lists*"[logbook]. Her additions were mainly word lists in preparation for the next lesson. With our help, she ended up adding 336 entries to the group lexicon. For his part, T_1 confided that he had difficulty "*[adding] things like proper names or things that are referring to idiomatic expressions, not idiomatic expressions, to grammar points because I wouldn't know where to start*"[interview]. He did, however, mention an interesting use that emerged from the needs of the class: "*We were looking for the etymology of a word and a student added it to the group's lexicon*"[T_1_G2]. T_1 added 32 entries in the lexicon of T_1_G1 and 6 in T_1_G2's.

T_1, for his part, does not use any other tools for teaching vocabulary and considers that using BaLex makes this work more "*enjoyable*", in particular because "*it affords different possibilities both for the teacher and the students*" and because of the possibility of sharing the lexicon within a group and being able to put labels on it. He acknowledged that this was his first time using the tool and said that he would use it again in the future, but in a different way — without explaining what he would change in his use.

According to T_3, being able to personalize the lexicon was very interesting and being involved in the study made learners aware of the importance of working on vocabulary. T_2 added that this study "*helped [her] in regard to just being even more aware of what vocabulary the students were using it for each unit*"[interview] and that she appreciated being able to filter words by label. She managed 350 entries and underlined the relevance of that functionality. She did not ask the students to create the entries because "*[her] class has the hybrid format and so they are already doing a lot on the OLI platform*"[interview]. She admitted that the creation of the word corpus will be useful to her for years to come.

In T_3's view, the tool may not be accessible to all learners. For weaker learners, "*it was a little out of their reach because the definitions are in French*", even "*frustrating.*" She suggested that a translation function would help. On the other hand, T_2 considers that the tool is appropriate for elementary learners who can use it instead of a translator. The advanced learners in the focus group, for their part, stated that the tool was adapted to their level of French.

One of the main benefits of BaLex is that "*whenever you put a word in it tells you all the different definitions even if they're not related to the class*"[focus group]. This is common to most dictionaries, the possibility to clean up the entries is not: "*When I'm trying to figure out the right word or right definition it's usually a passive thing but there I'm actively putting something in which like helps me remember it more*"[focus group]. Learners participating to the focus group concurred that they were more keen on using BaLex on an occasional basis rather than on an ongoing basis. Exploring what they meant, one learner stated "*like after class I want to review like if there's any new words*"[focus group]. This points towards regular use, but as a spectator, not an actor. This underlines the issue of the time allotted to the task (which is inherent to vocabulary learning).

5.5 How Do Students Experience the Cleaning of Entries?

One of the main features of the BaLex tool is the ability to retrieve entries from the Wiktionary and then adapt its content to the user's needs. Users can add, delete or change the order of definitions or examples in their lexicons (personal and group). The changes cannot be undone in one click, but it is possible to re-import from the wiktionary or another lexicon or manually correct the change in the other direction. On this point, feelings seem to be divided.

One learner noted that "*removing the definitions was helpful then it allowed you to go through all of them and then that way you're kind of more actively engaging with the word*"[focus group]. Conversely, another learner admitted that it was really hard to remove definitions. He considered it was "*losing that definition because you're not using it in that context*" and finally suggested that "*there should have been a way to like highlight certain definitions but*

not delete them entirely maybe". T_1 agreed with this suggestion ("*highlight some and shade others without deleting*"[interview]). Another suggested having "*like a check box of which you want to remove*" because removing them individually takes time. One suggestion for improvement to avoid deletions would be to put a label on the definitions rather than on the words. Finally, T_2 felt that to take full advantage of this feature, a minimum level of French was required ("*I didn't feel like I could assign the task you talked about, where they'd get rid of definitions, because they wouldn't know what they were getting rid of*"[interview]).

Teachers and learners therefore recognized the value of tidying up entries. However, their comments reveal the apprehension of doing things wrong and the limits of deletion, which cannot easily be undone.

5.6 The Collaborative Dimension: From Perceived Interest to Practical Implementation

The collaborative dimension was mentioned by T_1: "*the best learning is always a team sport*"[interview]. Only T_3 took advantage of this aspect. She presented it as a competition between learners "*competing with each other and seeing who's doing well in class there or who's winning or whatever*"[interview], a competition that she encouraged by announcing the most involved learners each week. As for the learners, when the experimenter asked whether using BaLex made learning vocabulary easier or more enjoyable, one replied "*I think it was useful to help us collaborate and share each other's words*"[focus group]. Another learner, when asked about his favorite features of BaLex, replied "*I like the collaborative aspect when you can see everyone else's words and then like to edit theirs and then add you own*"[focus group]. But learners also admitted that "*nobody used the collab features*"[focus group] and that they did not add words of the shared lexicon to their personal lexicon.

The lack of action on definitions and examples could also be linked to the fact that learners traditionally have lists of word-definitions ready to learn, without acting on them or customizing them. Although some learners produce or personalize their lists, they do so on an individual basis. The collaborative approach used in BaLex to create a common lexicon requires learners to take responsibility, and some may not be comfortable with the idea of being responsible for the final collective result. This is also visible in the little use students made of the labeling feature. Indeed, all learners combined created 4 labels while the other dozen of group and public labels were made by teachers.

6 CONCLUSION

In this paper, we reported a case-study of a TAVL software called BaLex, designed as a collaborative vocabulary notebook. The need for this kind of tool is highlighted by the body of work around the importance of vocabulary learning, which should not be focused solely on size but also on depth. With that in mind, we developed a first version of BaLex. In this paper, we reported the results of a study that took place in an ecological setting at the department of Languages, Cultures and Applied Linguistics at Carnegie Mellon University, which we believe suggest broader implications in the field for the design of TAVL tools.

The data particularly showed that teachers had different ways of integrating BaLex in their courses. These choices depended mainly on the students' proficiency level, but also on the instructional context (adult classes *vs* regular classes) and modality (face-to-face, hybrid or distance learning).

In terms of integration of TAVL tools, we should underline the importance of teacher activity. Traces show that, for the most part, learner contributions directly followed explicit instruction from teachers (with other mild activity peaks after teacher participation to group lexicons).

Still, in the course of this experiment, the connection data showed that learners did not use BaLex as much as expected. In addition to the feedback on the functionalities detailed in previous sections, some of the reasons given for low usage are directly linked to the prototype's aspect. The interface does not seem to have appealed much to users. Our future work will be dedicated to exploring how to integrate gamification functionalities to improve learners' engagement with the learning environment. Indeed, learners seem to be asking for a tool that goes beyond the lexical base, a tool that allows vocabulary to be practiced in fun activities. They want an application with more colors, with a "*scoreboard*"[focus group] and that is less "*scholarly*"[focus group]. With the idea of improving vocabulary practice, learners go so far as to suggest that "*there's tons of space to enter like little avatar and progress bars to sort of remind you you're working towards something not just words*"[focus group] and that "*if you could make more addicting it would be good*"[focus group].

Those remarks are all the more encouraging in that they are inline with the roadmap of the Lex:gaMe project. Beyond, the improvement of certain functionalities of BaLex (cf. § 5.5), the next step is to in-

terface the platform with two games that target different levels of vocabulary knowledge: MagicWord for low level skills (form, meaning) and Prisms (meaning, usage, strategy). In order to evaluate the effect of the upcoming games in vocabulary learning it was also important to assess BaLex as a standalone environment.

ACKNOWLEDGEMENTS

The authors thank the teachers who agreed to try BaLex, for the extra work-time for them and the extra information for us.

The authors also thank the ASLAN LabEx of Université de Lyon (ANR–10–LABX–0081) for its financial support as part of the french program "Investissements d'Avenir" managed by the Agence Nationale de la Recherche (ANR).

REFERENCES

A. Al-Jasir, M. (2019). Computer Assisted Vocabulary Learning: A Case Study on EFL Students at Al-Imam Muhammad Ibn Saud Islamic University. *Arab World English Journal*, (249):1–63.

Agustín Llach, M. P. and Canga Alonso, A. (2020). *Vocabulary Strategy Training to Enhance Second Language Acquisition in English as a Foreign Language*. Cambridge Scholars Publishing.

Béguin, P. and Rabardel, P. (2000). Designing for instrument-mediated activity. *Scandinavian Journal of Information Systems*, 12(1):173–190.

Council of Europe (2000). *Common European Framework of Reference for Languages: Learning, Teaching, Assessment*. Council of Europe ; Cambridge University Press, Strasbourg ; Cambridge, UK.

Driediger, M. (2024). Une analyse de l'intégration d'un outil tice en lansad : Étude de cas de l'outil balex dans les cours d'anglais. mathesis, Lyon.

Farangi, M., Nejadghanbar, H., Askary, F., and Ghorbani, A. (2015). The effects of podcasting on EFL upper-intermediate learners' speaking skills. *CALL-EJ*, 16:1–18.

Ginanjar Anjaniputra, A. and Salsabila, V. (2018). The merits of quizlet for vocabulary learning at tertiary level. *Indonesian EFL Journal*, 4:1.

Hao, T., Wang, Z., and Ardasheva, Y. (2021). Technology-Assisted Vocabulary Learning for EFL Learners: A Meta-Analysis. *Journal of Research on Educational Effectiveness*, 14(3):645–667.

Hilton, H. (2002). Modèles de l'acquisition lexicale en L2 : où en sommes-nous ? *ASp*, (35-36):201–217.

Jiang, N. and Liu, D. (2024). *Lexicosemantic Development*, chapter 2, page 13–23. Routledge Handbooks in Second Language Acquisition. Routledge, New York.

Klimova, B. (2021). Evaluating Impact of Mobile Applications on EFL University Learners' Vocabulary Learning – A Review Study. *Procedia Computer Science*, 184:859–864.

Laal, M. and Laal, M. (2012). Collaborative learning: What is it? *Procedia - Social and Behavioral Sciences*, 31:491–495.

Laufer, B. (1992). How Much Lexis is Necessary for Reading Comprehension? In Arnaud, P. J. L. and Béjoint, H., editors, *Vocabulary and Applied Linguistics*, pages 126–132. London.

Lin, J.-J. and Lin, H. (2019). Mobile-assisted ESL/EFL vocabulary learning: a systematic review and meta-analysis. *Computer Assisted Language Learning*, 32(8):878–919.

Lindqvist, C. and Ramnäs, M. (2017). L'enseignement du vocabulaire à l'université. (11-12):55–64.

Ma, Q. (2017). *Technologies for Teaching and Learning L2 Vocabulary*, chapter 4, page 45–61.

Nation, I. S. P. (1999). *Teaching and learning vocabulary*. Boston, Mass, nachdr. edition.

Nation, P. (2013). *Learning Vocabulary in Another Language*. Cambridge Applied Linguistics. 2 edition.

Oxford, R. and Crookall, D. (1990). Vocabulary Learning: A Critical Analysis of Techniques. *TESL Canada Journal*, 7(2):09–30.

Polguère, A. (2019). *Lexicologie et sémantique lexicale : Notions fondamentales*. Paramètres. Montréal.

Schmitt, N. and Schmitt, D. (2020). *Vocabulary in language teaching*. Cambridge University Press, second edition edition.

Scott, J. A. and Nagy, W. E. (2009). *Developing Word Consciousness*, page 106–117. International Reading Association.

Simonnet, E., Loiseau, M., and Lavoué, É. (2025). A systematic literature review of technology-assisted vocabulary learning. *Journal of Computer Assisted Learning*, 41(1):e13096. e13096 JCAL-24-125.R1.

Teng, F. (2014). Research Into Practice: Strategies for Teaching and Learning Vocabulary. *Beyond Words*, 2:41–57.

Tremblay, O. and Anctil, D. (2020). Introduction. — Recherches actuelles en didactique du lexique : avancées, réflexions, méthodes. *Lidil. Revue de linguistique et de didactique des langues*, (62).

Ye, S. X., Shi, J., and Liao, L. (2023). An evaluative review of mobile-assisted l2 vocabulary learning approaches based on the situated learning theory. *Journal of Curriculum and Teaching*.

Yu, A. and Trainin, G. (2022). A meta-analysis examining technology-assisted L2 vocabulary learning. *ReCALL*, 34(2):235–252.