

Developing a cross-platform web application for online EFL vocabulary learning courses

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Abstract. In this paper, the development of a web application for self-access English vocabulary courses at a national university in Japan will be reported upon. Whilst the basic concepts are inherited from an old Flash-based online vocabulary learning system that had been long used at the university, the new HTML5-based app comes with several new features that are expected to assist students with effective vocabulary learning. Not only is it now made compatible with smartphones, it also enables students to visually check their own progress and their ranking in the class. According to the questionnaire survey conducted among its pilot users, almost 30% of them used the app on their smartphones. Overall, the users found the app beneficial – they especially liked features such as listening to word pronunciation, and checking their own ranking within the class. However, there is room for improvement regarding the usability of the app.

Keywords: mobile learning, CALL, vocabulary learning, software development.

1. Background

Learning a list of word forms and their meanings is still an essential part of English as a Foreign Language (EFL) vocabulary acquisition (c.f. [Webb & Nation, 2017](#)). In Japan's tertiary-level EFL education, list learning is a realistic and efficient way of providing learners with a broad range of English words and phrases, considering the extremely limited hours of face-to-face English classes. Utilizing Web-

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Based Training (WBT) for list learning has shown positive effects on vocabulary development (c.f. [Burston, 2015](#)) and is expected to avoid the monotony of mechanical self-learning as well as visualize learner progress.

Hiroshima University, a national university in western Japan with 11 faculties and 10,887 undergraduate students (as of May 2017), has implemented large-scale, web-based EFL vocabulary courses since 2011. Each year, approximately 1,000 first-year students of non-English majors take these online courses, such as ‘Communication Basic I’ and ‘Communication Basic II’. In these courses, the students are required to learn 3,000 words per semester (15 weeks) and 6,000 per year on a self-study basis. A vocabulary list of 6,000 essential words with two levels (standard and advanced) was developed for the courses. With this list, learners can build up their vocabulary for daily communication as well as for academic and business situations.

At Hiroshima University, an original WBT system for vocabulary learning called the ‘VP System’ has been long used for courses involving online self-learning. Developed with Macromedia Flash (currently owned by Adobe) in 2001, it enables the students to learn a large amount of target words in small steps and then review them repeatedly. The system is designed to be easily used by students with different computer-based skills, and to be accessible anytime and anywhere. Detailed records of progress are stored in the server, so that the instructors can use them to assess each student’s WBT performance. Whilst these online courses have been found effective in actually expanding students’ vocabulary, the old-fashioned VP System running on Flash Player has become increasingly problematic in recent years. The materials are not available on mobile devices, such as smartphones, which enjoy a high penetration rate among university students, and some of the popular PC web browsers are starting to block the Flash plugin by default for security reasons. In order to give these students a wider choice of platforms so that the materials can be accessed from diverse devices, including smartphones and tablets, and to avoid coping with security issues involving Flash Player, a new cross-platform web application had to be developed by exploiting the HTML5 technology. Hence, the purposes of this paper will be to explain the features of this new application, and then to report on which features the users found useful.

2. The HiroTan app: system development

The new application was named HiroTan – a portmanteau of ‘Hiroshima’ and ‘Tango’ (a Japanese word meaning ‘word’). HiroTan was designed as a web-based

app that is optimized for mobile devices as well as PCs. It inherits all the concepts from the old VP System: as is explained in Enokida (2009), a total of 100 words are provided in each chapter, which is broken down into 16 units. Students can learn the form, meaning, and pronunciation of ten words each in the first ten units, and the next five units are devoted to practising them again. The form and translation of each target word are displayed on the screen, where the pronunciation can be heard by clicking/tapping on each word. Then students can check their vocabulary knowledge by matching each word with the correct choice of translation (Figure 1). The final unit is for the review test, where students cannot proceed to the next chapter until they gain a pass level with a minimum of 80%. There are 30 chapters to be learned in one semester, containing 3,000 words in total. Students are given a time limit to finish each unit.

Figure 1. Learning a unit of ten words on HiroTan

復習モードです。解答しても成績には反映されません。

Step2: 確認テスト

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採点するには、すべてをドラッグしてください。

announcement	_____	
ignore	_____	無視する
souvenir	_____	くれた
tutor	_____	治療する
bloom	花が咲く	勉強を教える
fund	_____	薬
apologize	_____	資金
cure	_____	おみやげ
drug	_____	お知らせ
informal	_____	謝る

HiroTan also comes with several new features. In the user dashboard, learners can check their own progress, such as the number of words they have learned over the past seven days ('This week'), the number of words they have learned each week ('Weekly'), and their ranking among the whole group of students ('Your position') (Figure 2). These features are intended to encourage learners to set their own pace for successful self-learning, and to improve their learning by comparing their performance with their classmates. The app also supports multiple languages based on Unicode, whilst the VP System only supported Japanese and English.

Figure 2. ‘This week’, ‘Weekly’, and ‘Your position’ in the dashboard



3. Users' feedback and discussion

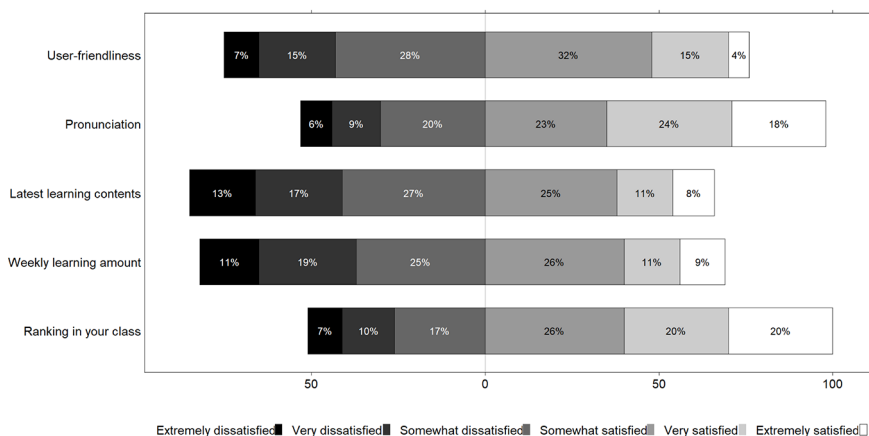
The HiroTan application was released for pilot use and evaluation in Academic Year 2017. It was used in several vocabulary building courses in the first semester, including part of Communication Basic I. In Communication Basic I, students were required to learn 3,000 words, as mentioned above, with the HiroTan app by the end of the semester. Grades were based on the online performance recorded on the server, and the score of the paper-based final exam.

A questionnaire survey was conducted at the end of the semester to evaluate the app. The question items were: (1) on which platform they mainly used the HiroTan app (PC, smartphone, or both)?; (2) how usable they found the app?; and (3) to what extent they found each of the following functions useful: audio pronunciation, ‘This week’ (latest learning contents), ‘Weekly’ (weekly learning contents), and ‘Your position’ (ranking in your class)? The students were requested to answer Questions 2 and 3 on a six-point Likert scale. There were 151 respondents.

As for Item 1 (the main platform to access HiroTan), 70.2% of the respondents answered “PC”, followed by “both PC and smartphone” (17.9%) and “smartphone” (11.9%). Nearly 30% of them incorporated mobile devices into their vocabulary

learning. It is not surprising that 70% of them still chose the PC, given the fact that all the first-year students at Hiroshima University are now required to bring their own laptop to campus: they found it easier to do their coursework on devices with a larger screen. The results of Items 2 and 3 (user-friendliness, pronunciation, latest learning contents, weekly learning contents, and ranking in your class) are presented as diverging stacked bar charts in Figure 3.

Figure 3. Survey results: questions 2 and 3 (N=151)



Although positive feedback was found on features such as audio playback of word pronunciation and displaying their ranking in class, the popularity of the latest learning contents and weekly learning amount was relatively weak. The students tend to be more interested in comparing their performance with that of their classmates than monitoring their own achievements as an individual learner. Future users of the app could be encouraged to use more the information in ‘This week’ and ‘Weekly’ for the latter purpose. Also, there is room for improvement regarding the usability of the app, as is shown in the split opinions on user-friendliness. Further bug fixes and updates will enable them to focus more on learning rather than technology. Overall, however, the pilot version of HiroTan was found beneficial enough to its users.

4. Conclusion and future directions

The HiroTan app was made available to all the 1,000 students taking the Communication Basic I/II courses from the second semester of 2017. Further

improvements are to be made on the usability and functionality of the app, based on the feedback from its users. New features planned for future versions of the app include dictation quizzes to check listening and spelling abilities, and cloze tests to practice new vocabulary in context. Questions regarding the effectiveness of WBT-based list learning should also be addressed, such as: (1) what vocabulary knowledge and skills do the learners acquire as a result of list learning?; and (2) to what extent will learning an enormous word list contribute to long-term retention and appropriate use of these words in communicative contexts?

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