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Supporting English Course with Mobile Devices: How Can We Learn Vocabulary Seamlessly?

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Abstract: We proposed SMALL system as a blue print seeking for seamless language learning in our previous study. In this paper, we describe how far we have developed the system for the realization of intertwining in-class formal learning with outside-class self-learning. As our first step, the target has been English vocabulary learning, since vocabulary learning is one of the fundamental aspects of language learning. We also aim to create a knowledge-aware virtual learning community to promote P2P interaction in our seamless learning environment.

Keywords: Mobile Assisted Language Learning (MALL), Seamless Learning, Vocabulary Learning, Learning Log, EFL, TESOL

Introduction

English has been a dominant language in the world [1]. Therefore EFL (English as a Foreign Language) education is pivotal for non-English speaking countries including Japan. However, Japan is facing a serious problem in terms of English proficiency. "… it is rare to find a Japanese student who, after six years of English, is able to engage in even a marginal dialogue with a speaker of English" [2]. Japan ranked 3rd worst out of 30 Asian countries in TOEFL test (Test of English as a Foreign Language) [3]. One of the factors which have caused this disappointing situation is lack of learning time of English at school [4]. If time to study in class is limited, there is no other way but to learn outside class. Here our basic issue is to establish an effective method to carry out outside-class learning as well as to entwine in-class learning with outside-class learning. Along with the shortage problem, it has been long pointed out that Japanese EFL learners are in lack of vocabulary. Since it is an essential component in language as is often cited, "Without grammar, very little can be conveyed. Without vocabulary, nothing can be conveyed" [5], it is pivotal to build up vocabulary to improve one's language skill. Besides, vocabulary learning is often considered boring [6]. One solution of these problems may lie in mobile assisted language learning, which has been gaining global attention in recent years. Since mobile phones are most popularly used in Japan, the idea is realistic. So our aim is to provide EFL learners with a seamless vocabulary learning support system, namely SMALL system.

1. Theoretical Background

1.1 Seamless Learning

Recent progress of mobile and wireless technologies offers us a new learning environment, namely "seamless learning". "Seamless learning" is used to describe the situations where students can learn whenever they want to in a variety of scenarios and that they can switch from one scenario to another easily and quickly using one device or more per student ("one-to-one") as a mediator [7]. In this paper, however, by seamless learning, we mean learning which occurs with smooth and seamless transitions between in-class and out-class learning as "American College Personnel Association (1994) stresses the importance of linking students' in-class and out-of-class experiences to create seamless learning and academic success." [8]. Seamless learning can be depicted in a two-dimensional way 1) in-class and out-class learning and 2) planned and unplanned learning. Thus there are four types of learning accordingly: in-class planned learning, in-class unplanned learning, out-class planned learning and out-class unplanned learning [9]. And if the technology could help these four types of learning interact with one another and help them to be incorporated into one continuous learning beyond time and space, learning could be very successful.

In addition, we need to consider that we usually have only one instructor per class, small or large. What the teacher can do through these four types of learning is limited. So peer-to-peer (P2P) collaboration is necessary for successful seamless learning. How we can adopt P2P collaboration effectively in a seamless learning is another key issue. We aim to create a knowledge-aware virtual learning community to promote P2P interaction in our seamless learning environment.

1.2 Mobile Assisted Vocabulary Learning

Vocabulary is one of the most important components of a language. But living in Japan, students rarely have exposure to English outside the classroom. Since incidental learning is not highly expected, they should be encouraged to learn vocabulary outside-classroom on an autonomous basis. Then here come the questions: What is effective vocabulary learning? How should learners learn vocabulary? Unfortunately, researches on vocabulary learning strategies are in a lack of theoretical underpinning up to now [10]. However, along with recent development of studies on technology enhanced learning, there have been considerable studies on mobile assisted vocabulary learning such as *Vocab Tutor* [11], *Moodle for Mobile* [12], *m-iLexicon* [13] including commercial products such as *Eigo Duke* (*English Training: Have Fun Improving Your Skills!*) [14]. However, most of these vocabulary learning systems are ready-made closed vocabulary learning systems which often specialize the textbook vocabulary or chosen vocabulary of say, basic 3000 word-level. Learners cannot customize their own want-to-learn vocabulary. Besides, many of them are aiming for self-vocabulary learning, outside the classroom. There are few which challenged to entwine in-class planned vocabulary learning with out-class open vocabulary learning. Therefore our main purpose is to develop the system which links what students have learned outside-class with what they have learned inside-class, and also with what other students have learned.

1.3 Importance of Link

Why is it important to link? We learn words from the context [15]. The whole (contexts) precedes the part (words) in language acquisition [16]. Therefore we need the contexts

where the words are used in order to learn vocabulary. For instance, for many Japanese learners of English, it is difficult to grasp the meaning of 'subject to' unless they encounter this phrase repeatedly in different contexts as below:

- All visitors and packages are subject to electronic scan.
- This Agreement shall be subject to the laws of Japan.
- The terms of your account are subject to change

Therefore by linking the one context to another, the system let them learn how the words are used in different contexts. It is reported that frequency of occurrence encourages incidental vocabulary learning and that reappearance of a word reinforces the form-meaning connection in the learner's mental lexicon [17]. These facts endorse the importance of linking.

2. System Design

2.1 SMALL System

Based upon the above ideas, we designed the following Seamless Mobile-Assisted Language Learning Support System (hereafter we call it SMALL System) (Figure 1) in our previous study [18].

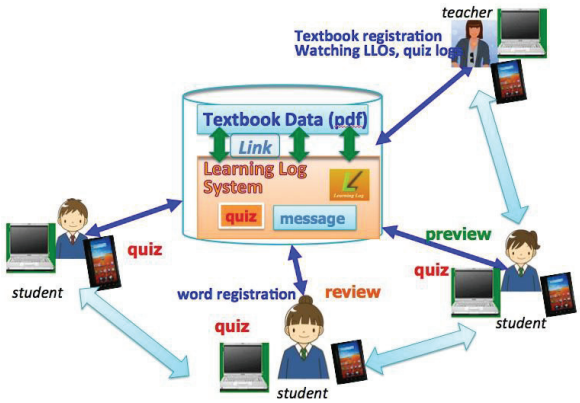

Figure 1. SMALL System (Seamless Mobile-Assisted Language Learning Support System : http://ll.is.tokushima-u.ac.jp/ecourse/)

2.1.1 Textbook Data

Texbook Data in Figure 1 consists of the whole units of the textbook to be learned through one semester. This system is available for any textbooks if they have Pdf versions. Instructors upload Pdf file textbook data to the system (Figure 2). They can add and delete files anytime.

Figure 2. Textbook data uploading interface

2.1.2 Learning Log System

Learning Log System, SCROLL is a system developed by our team. Users register what they have learned, which we call "learning log objects (LLO)" to the system and view LLOs uploaded by themselves and others, then it supports recalling of their learning logs by giving them quizzes [19].

2.1.3 Quiz

Students register textbook target words and their newly acquired words during their self-learning and the system gives them quizzes. It generates quizzes automatically based on the LLOs registered and viewed by the students. The aim of the quiz is to help the students retain their vocabulary. Quizzes will be generated until they give them correct answers. And after a certain interval, the system gives them quizzes which they have answered correctly to make sure if they are retaining their acquired vocabulary. That way it is expected that their short-term memory will be reinforced into long-term memory. Logs of all the quizzes done by the students are stored to be analyzed and evaluated. Wrong answer rates reflect the quiz generation and if the users click "too easy" or "too difficult", it also reflects quiz generation and difficulty level adjustment is made so that it facilitates their learning processes.

2.1.4 Message

Users are able to send massages to other users in this system. In "All Logs" page, it shows the names of the users who registered the objects. When a viewer clicks the nickname, new window will be popped up and can send a message to him. This function will promote the students' interaction or discussion and will lead to collaborative learning which will be inevitable where the teacher in not there outside-class self-learning.

2.2 The scenario

The scenario using this system is as follows.

2.2.1 Preview (mobile-based out-class planned/unplanned learning)

Students resiger textbook target words instructed by the teacher and read the text for preview and take target word quizzes. They answer multiple-choice quizzes. Quizzes will be generated until they make correct answers. They can read texts and answer quizzes at any time and at any location using mobile devices.

2.2.2 Lessons (PC-based in-class planned/unplanned learning)

In the electronic textbook, student registered words are hyperlinked and when the teacher clicks them, a side bar will appear and it shows the names of the students who registered them so that the teacher will be able to know how many students and who have learned them. (Figure 3).

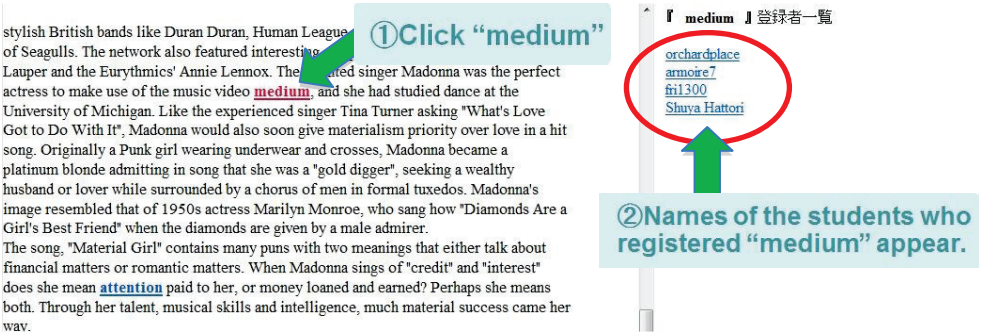

Figure 3. textbook interface

2.2.3 Review (mobile-based out-class planned/unplanned learning)

Students read the text for review and take target word quizzes. The quiz logs show the results with most frequently mistaken words and the teacher will review these words in the next class. So the learning occurs continuously.

2.2.4 Expanded Self-learning (mobile-based out-class unplanned learning):How can we entwine formal learning with informal learning?

Students are assigned to do self-learning and register new words to the system. Each student is supposed to present in-class in turn what he/she has learned through his/her out-class self-learning so that the teacher can incorporate students’ unplanned self-learning into classroom activities. They are encouraged to collaborate with other students who have the same interests.

This system aims to entwine outside-class learning with in-class learning. It also entwines a students’s self-learning with that of another. Figure 4 shows how in-class vocabulary learning and out-class vocabulary learning are linked. When a student, Yusuke, registers new word, “including”, which he already learned in the textbook, then the system shows him the textbook context where it appears. This linking function is pivotal for two reasons. For one reason, students need to encounter as many contexts as possible to learn words. For another, generally people are likely to forget what they have learned. Therefore even though he felt “ including” was totally new to him, the system let him know that he has learned it before in the textbook. If Yusuke and registered the same word, “inspire” that Miwa has already registered, then it shows Yusuke that Miwa did it too, which is expected to lead some interaction between them. It is also expected to add some fun factor in vocabulary learning to know that another classmate is learning the same word.

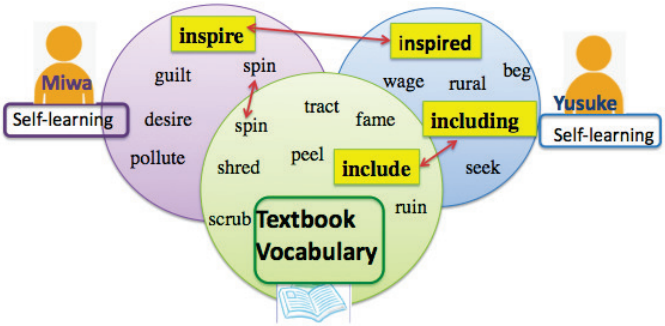

Figure 4. Link between in-class learning and outside learning

In order to motivate them to learn more, the System shows each student his degree of advancement by counting his correct answers out of total number of target words.
With the help from the system, students can be aware of what they have learned before, and what other students are learning, and the teacher can grasp what the students are learning outside-class and incorporate students' unplanned self-learning into classroom activities so that close link between in-class and out-class learning will be realized.
Generally, English education at the university level is arbitrary and leaves to the discretion of the instructors. Therefore it is easy to run the class described above. But Japanese secondary education is subject to the guidelines issued by the Ministry of Education, Culture, Sports, Science and Technology. Therefore in order to introduce students' out-class learning into 7^{th}-12^{th} class, we need a fundamental reform of the curriculum. A high-level discussion on this issue in the Ministry is strongly desired.
In order to measure how out-class vocabulary learning is linked with in-class one, we propose *link rate* which should be caliculated as follows:

$$\text{link rate} = \frac{\text{n. of registered words}}{\text{n. of words in one chapter} - (\text{n. of words learned during } 7^{th} \text{ grade} + \alpha)}$$

This equation shows the rate of overlapped vocabulary learned in- and out-class learning. The average number of words in one chapter of the textbook was 913 words. The number of words learned during 7th grade was 398 words. The 7th grade is the first year of learning English. So they are very easy, fundamental words. We excluded these words plus a few more words because collage undergraduates were most unlikely to register such words to the system. "A few more words" described as 'α' in the above equation was judged by an experienced English teacher. This notion is still in progress and we are far from being sure whether this rate shows the effectiveness rate of vocabulary learning. Further exploration would be necessary.

3. Method

Upon the completion of the system, the following experiment will be conducted.

3.1 Experiment

Forty university students will be divided into two groups with the equal English proficiency according to the pre-test result. The test consists of target words to be learned in the textbook. Each group will be engaged in learning vocabulary, where Group A will use SMALL System, while Group B will learn vocabulary with Mircosoft Excel files to make their own vocabulary lists using home PCs and classroom PCs. Evaluation will be carried out over a period of six weeks. At the end of the phase, the subjects will undergo two kinds of post-tests: the same vocabulary test as the pre-test (Post-test 1) and a vocabulary test containing self-learned words gained through unplanned learning (Post-test 2). As for Group A, Post-test 2 will be created by the System which identifies what they have learned through self-learning. As for Group B, it will be created based on each student's word list by Excel files. Both post-tests will be designed to translate the target words into Japanese. The students will also be given questionnaires. Further data will be collected from the subjects of Group A by means of the log data contained in the server.

3.2 Pilot

Before the actual classroom use, 6 university graduate students and 1 undergraduate were asked to give a trial use of the system to see if any serious problem exists to carry out the above mentioned experiment. The subjects were asked to register 5 recommended words with their contexts, to click the words they registered in the textbook pages to learn other contexts and to send messages to other users. In the end of the experiment, they were surveyed by the questionnaire. Table 1 shows the result of the questionnaire.

Table 1 Questionnaire Results (five-point-scale)

Questions	M	SD
Did you like it when the system let you know that you can find your self acquired vocabulary in the textbook?	4.57	0.49
Did you like it when the system let you know that your self-acquired vocabulary is also registered by other users?	4	1.07
Was it useful for your vocabulary learning to read textbook contexts where your registered words appeared?	4.57	0.49
Was it useful for your vocabulary learning to read other contexts of your self-acquired words which were registered by other users?	4.43	0.73
Was the message system useful for collaborative work?	3.71	1.16

Open Comments

- It would be better if I can see the meaning and contexts of the word registered by others at the same time (by one click).
- The letter size and space between lines of the textbook were small. it would be more convenient if I could see the meaning of the words not by clicking but by just positioning the cursor.
- Color coding of the words in the textbook was helpful for me to know if those are my registered words or those by others. Linking my newly registered words with textbook page would be more convenient.
- The textbook interface and layout were not user-friendly. I wanted to see the illustrations in the web textbook just like its paper textbook version.
- I could not check if I could send the message successfully.
- If I clicked the words in the textbook, it showed the names of the learners who registered the word, but I'd like to know the contexts rather than the authors.
- Word registration in this system helped me retaining the word in my memory.

Unfortunately there was no time to do some collaboration in this pilot. In order to let them do some collaborative work, longer-term experiment is necessary. We are planning to conduct a long-term experiment during the second semester 2011.

4. Early Insight and Future Works

Upon the above questionnaire results, we have found that we need to improve textbook interface and linking function of registered words and textbook contexts. We have not acquired any data on the classroom use, but possible advantages of the System that we expect are: 1) In-class and out-class vocabulary learning are closely linked so that what they learn in-class will be reinforced in out-class learning and vice versa. 2) Since we learn words from contexts, its linking function can lead to effective vocabulary learning. 3) It encourages out-class self-learning, which is expected to compensate the lack of learning time in class. 4) Linking between the students who registered the same word or who read the

same contents could trigger peer-to-peer interactive learning, which is expected to add some fun factor to vocabulary learning which is reported to be monotonous. The disadvantage of this system is that it may be unfair for the students who do not own smart phones unless the project team could provide them.

As our further future work, improvement of the system's capability of identifying related words or derived lexical items will be needed so that when the students register related words, it will be able to successfully make links. That way one's unplanned self-learning will be entwined with that of other students more deeply.

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