How to increase ubiquitous experiential learning

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Abstract: This paper introduces a mechanism in a ubiquitous learning log system, which is designed to guide learners to participate in the learning activities recommended by the system. In order to provoke learners' interests on the knowledge, the recommended knowledge is related to both what learners are studying and the learners' current learning contexts. And to help learners grasp the knowledge, in the second step the mechanism provides learners with relevant learning activities to guide learners to use the recommended knowledge.

Keywords: Ubiquitous learning log, location based recommendation, learning experience, language learning

Introduction

The fact that a lot of note taking software such as evernote is popular with smartphone users proves that taking notes with digital devices is a becoming common way [1]. And besides the informal notes (like reminder, to-do list) [2], [3], knowledge or learning experience can also be tracked as formal notes, such as English vocabulary [4]. This kind of formal notes is called ubiquitous learning log in this study. In order to make use of learners' learning logs, we proposed two directions to deal with them. On one hand the ubiquitous learning log can be used to help learners to review and recall what they have learned; on the other hand it can be treated as learning source to be recommended to other learners. We have developed a system called SCROLL (System for Capturing and Reminding of Learning Log) to implement this proposal. But the way to recommend specified learner with other learners' ubiquitous learning log does not perform as well as we expected [5]. Therefore, in this paper we propose a new way to improve the recommendation.

Another goal of this paper is to introduce a way to induce learner to use the recommended knowledge. We do this for two reasons. Firstly, according to the learning by experience theory, learning through experience can reinforce learners' efficiency of mastering the obtained knowledge [6]. Secondly, the recommended knowledge should be linked from the digital world with the real world. And it may motivate learners' interests compared with only presenting knowledge in the digital devices [7]. Consequently, a mechanism about how to induce learners to participate in activities in real world using the recommended knowledge is also described in this paper.

The rest of this paper is organized as follows. In section 1, we describe the previous work and give a brief introduction about SCROLL. Section 2 presents a new way of recommending ubiquitous learning log based on learning context. Then, the mechanism to induce learner to use the recommended knowledge is described. Finally, we give the conclusion and the future work of this study.

1. Previous work

The ubiquitous learning log is defined as a recorded form of knowledge or learning experience acquired in our daily lives and it serves as memory storage for notable or important knowledge to review, to remind and to reflect. SCOLL is a system to help learners to record and recall their ubiquitous learning log. Until now, it mainly focuses on the language learning field, especially on assisting international students to study Japanese in Japan. Therefore, in this case the ubiquitous learning log represents the Japanese knowledge gained by the oversea students in their daily lives in different kinds of situations, such as shopping in the market, seeing a doctor in the hospital, having a haircut in a barbershop, visiting the museum and so on.

In order to recommend specified learners with other learners' learning logs, the paper [5] also presented one way of recommendation, which can notify a learner with other learners' learning logs near him. And if he selects his interested learning logs, the system will show him a path from the current location to the selected learning logs on the map. Even though the recommendation has considered the factors such as the languages that the learner studies, his mother language and his proficiency level of the learning language, the learners' response rate of such recommendation is quite low (only 25% [5]). We find two reasons, which can account for the fact. One is that such recommendation way is not capable of arousing learners' interests or curiosity to study other learners' learning logs and even to find out them via the help of the navigator function. The other one is that only the knowledge recommendation does not motivate learners to explore more about the knowledge and does not help learners to memorize or master the knowledge. Therefore, in order to improve the meaningful recommendation rate for learners and to induce learners to use the knowledge, we propose a new way, which includes two parts: providing the learners with the learning logs relevant to the learning activity at hand and inducing the learners to use the recommended knowledge. The following two sections introduce the two parts separately.

2. Related learning log recommendation

To improve the quality of the recommendation, the system will recommend the knowledge more related with what the learners are studying. It means that the recommendation occurs after the learner saved his learning log and then the system will search the other learners' learning logs related to the saved one in two directions: context-related and concept-related. The following sections will introduce the two directions in detail.

2.1 Similar context based learning logs

In the study [5], we introduced a kind of learning log called location-based learning log. This kind of learning log is regarded as the knowledge that can be recalled by the location as a retrieval cue. According to the theory of encoding specificity, the place where we learned can be encoded as a retrieval cue initially and it is effective to activate a stored memory [5]. Therefore, when a learner (called learner A) comes near to the place where he learned something, the system can remind him of his old knowledge. What's more, if another learner (learner B), who has the same learning needs with learner A, also comes to the place where learner A learned, the system will recommend learner A's knowledge for learner B. However, because a learning log is only combined with only one place, the probability of such recommendation is relatively low. Therefore, we propose another concept: similar context based learning log. It means that a learning log is not only related to the place where the learner learned it, but also related to the similar context. For example, if we learned the

Japanese names of vegetables in a supermarket, it is also meaningful to remind us of the knowledge in another supermarket. Consequently, when a learning log is created by a learner, he is recommended to designate what kinds of contexts the learning logs are related to. The learners are motivated to do this because the system can also help them to recall what they have learned based on the similar contexts. And the automatic context detection function, which is implemented by making use of learners' GPS data and Google Places API (Application Programming Interface), makes it convenient for learners to choose the context of the learning log. In addition, the contexts have been predefined including school, hospital, super-market and so on.

As a result, the new way of recommendation will focus on both the contexts that learning logs are belonged and the learners' current learning context. For example, if a learner learned "豆腐 (tofu)" in the supermarket context, the system will provide the learner with the other learning logs in the supermarket context.

2.2 Related learning logs

After searched the learning logs in similar context, the system will focus on the learning logs which are most relevant to. To judge how related two learning logs are, the system utilizes the tag of the learning log to calculate the two learning logs' distance. For example, in Figure 1 tofu and celery share a same tag: cooking, so the distance between tofu and celery is 1. Similarly, the distance between celery and tomato is also 1 and the distance between tofu and tomato is 2. In this study, only the learning logs, whose distances from the original learning log are less than 3, are recommended for the learner.

Figure 1. Distances among learning logs

3. Induce learner to use the knowledge

According to the experiential learning theory, knowledge can be created from the combination of grasping and transforming experience [8]. Thereby, to help learners to grasp and master other learners' learning logs, the system is designed to induce learners to use the recommended knowledge. And to induce the learners, a concept called task is proposed. What are tasks, who provides the tasks and how the learners participated in the tasks are discussed in the next two sections.

3.1 What are tasks and who provides tasks?

Tasks are referred as the activities that the knowledge can be used. They are related to the learning contexts talked in section III like school, hospital, post office and so on. For instance, if the system recommends a learner a Japanese word "トマト(tomato)" in a supermarket, the learner can talk with the staffs in the supermarket using the word "トマト (tomato)", such as asking its price, location, recipe and so on. And it has been proved that by talking with the Japanese native speaker using the recommended word, learner can master the word well [9]. The activity of asking about the information is a kind of the so-called task.

Basically, the learners who saved the learning log are responsible for providing what kinds of tasks the knowledge can be utilized. And one learning log can be used in several tasks. Moreover, the system provides some predefined tasks in different contexts in order to reduce the learners' burden of designating tasks when they save their learning logs. Table 1 shows part of the predefined tasks in different contexts. What's more, the tasks can be defined by the learner and designated by the administrator of the system.

Table 1. The predefined tasks and their contexts

Context	Predefined Tasks
Post office	Ask about the postage Buy a piece of stamp or an envelope
Restaurant	Ask about the recommended menu
Bank	Ask about the interest rate, currencies deposit money
Hotel	Ask about the check in time Ask about the campaign
Airport	Ask about the flight
Station	Ask about the route, the price Ask about how to buy a ticket

3.2 How learners participated in tasks?

Because one learning log has several tasks, the system assigns the appropriate task for a learner based on the difficulty of the task and the learner's ability. For example, asking the price of the production is easy for learners to finish while asking about the recipe of the vegetables is quite difficult for most learners. And when the learners received the recommended the learning log and the task, they are also asked to provide feedback for the system. For example, they are asked to take the photos of the object if they are asked to inquire the location of it. And if they are asked to learn about the place of the production, they need to accomplish this information on the system. Only providing the feedback can prove that they have really used the knowledge. And if the learner meets new problems when he carries out the tasks, he can record them in photos, videos, audios or texts and upload them to the system in order to ask for help. Such accumulated data is also meaningful for the other learners.

4. Conclusion and future work

This paper describes a mechanism of recommending learners with ubiquitous learning logs which are relevant to learners' learning contexts. It considers both the context-based correlation and concept-based correlation. Moreover, the mechanism is also designed to induce learners to use the recommended knowledge in the real world. The tasks related to the contexts are offered by the system. After finished the tasks, the learners are asked to provide the feedback and questions. To motivate learners participate in the activities are help them to master the knowledge is the final goal of this mechanism. As for the future work, we will implement the system and conduct an experiment to evaluate this mechanism. Both the usability of the system and the learners' response will be evaluated.

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