

# Supporting a Decision Making for Task Assignments in Language Learning Outside Classroom with Handhelds

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**Abstract:** The existence of wireless and mobile technology has provided opportunities to support learning regardless of the physical learning space. Thus, usage of mobile terminals such as smart PDA (personal digital assistant) in a learning system is very common phenomenon. Mobile devices can communicate with wireless mobile terminal and realize the intelligence exchange with its surroundings. Based on this current trend and the need to realize learning in a more dynamic environment, a LOCH (Language Learning outside the Classroom) system named One Day Trip is developed to assist overseas students to learn Japanese in real life situations with the help of a PDA. This paper proposes a task assignment support to help the teacher to give learners appropriate tasks in the learning environment.

**Keywords:** mobile Learning, language learning, task assignments.

## Introduction

Mobile learning has advanced greatly since the time of its predecessors. Mobile learning is about learning with portable technologies for increasing learners' capability to physically move their own learning environment with them. Lightweight devices such as PDA (personal digital assistants) and mobile phones are used and enable connection to the Internet with wireless communication technologies [9]. Mobile devices are opening an additional platform to support learning. Wireless mobile learning devices offer stunning technical capabilities for the development of new systems, because of their portability and low cost. Thus, this helps to create a seamless, real time communication and retrieval of information about the learning context. The main characteristics of mobile learning involve concepts such as permanency, accessibility, immediacy, interactivity and situating of instructional activities [6].

This project is conceived to assist overseas students to learn Japanese while involved in real life situations with authentic learning in which it is learner centered, active, and takes place around real world situations [8]. Students who are involved in this system have studied Japanese for six months and have a basic knowledge of Japanese for daily conversation and survival. This project has been started in 2003. Before this system was developed, the teacher used to assign tasks to students on a piece of paper for the students to go around the town, interact with native speakers and bring back their findings and/or questions. The motivation for the creation of LOCH is due to the following background issues:

(1) Before using LOCH, overseas students sometimes got lost in town and a lot of time is

wasted to find their way back to the university. Therefore, it is necessary for teachers to understand where the students are.

- (2) It is very difficult for overseas students to tell others where they are, because there are only a few street signs in Japan and most of them are written in Japanese only. Therefore, GPS (Global Positioning System) is used to locate the position of the students when they are moving in town.
- (3) Since the intensive Japanese language course is only for 6 months, it is insufficient to teach and learn all kinds of language knowledge in their daily life. The usage of dialects by the people in town makes conversation more difficult. Therefore, these activities are very valuable, practical and serve as a training ground for overseas students to communicate with Japanese people in their daily life in Japan.

The LOCH was developed as an activity oriented program to aid in language learning in real life. Examples of activities/ tasks given to the students are as follows [3]:

- (1) Interview a person: Students go to an office/location and interview a person in charge in Japanese for about ten minutes. The mission is to record the interview and take a picture of the person with the PDA.
- (2) Gather information: The task involves going to specific location and gather information. For example, the student is asked to go to the railway station, asks the staff about the fare and frequency of a certain ride.
- (3) Buy something local: For example, the student goes to the supermarket, buys a Japanese traditional food, “fish sausage” and asks about the cooking process.
- (4) Experiential activity: This type of mission for the student is to go to the university’s health care center and take an eye test and check his/her own blood pressure.

By carrying out those tasks, overseas students are able to enhance their communication skills in Japanese language and experience the local culture like the local food and activities. The teacher assigns tasks to students to go around town and interact with native speakers. The PDA is used to interact with the teacher. The GPS allows the teacher to track students’ position on a map. Students can also make use of their PDAs for writing down annotations, recording questions, taking pictures and reporting back to the teacher. At anytime, the teacher can monitor the position of the students and can establish communication with them, through the BBS (bulletin board system) or the map interface. The teacher guides the students through the task activities, giving suggestions or hints (such as “Ask somebody how to get there” or “You have to find the post office first”).

After all the students conclude their tasks, they will meet again for discussion and reflection. All the gathered information is displayed and discussed with the teacher chairing this session, and each student explains his/her strategies to the rest of the group. This kind of activity not only gives students more insight to real life in Japan but also exposes them to the possibility of using mobile devices to learn and improve their language ability. This paper proposes the task assignment function to increase the efficiency of language learning.

As for related works, Thornton and Houser [4] developed an English text message system using mobile phone. Uther et al [11] developed a mobile learning application for speech/audio language training using Java J2ME. Also PhotoStudy [4] was developed in order to support vocabulary study with mobile phones. In addition, there are a lot of commercial products and Podcast contents to support mobile language learning. According to [5], there are two kinds of educational use of positioning technologies. One is tracking users’ location and showing them to their partners for support collaboration among users. For example, DigitalEE II [7] and Ambient Wood [9] support children to learn about ecology by sharing learners’ location, which helps coordination for collaborative learning. The other is triggering specific events or allowing learners to post messages bound to this specific location. For example, GIUDE system [2] provides

appropriate information according to visitor's location. However, little attention has been paid for employing positioning technologies for language learning. LOCH system uses GPS in order that overseas students can notify teachers their location and teachers can give location specific advice. Also students' current locations are used to provide an appropriate task to them.

## 1. LOCH

### 1.1 Functions of the system

The LOCH system has the following functions:

- (1) BBS (Bulletin Board System): Students use the BBS to interact and communicate with the teacher for constant advice and interaction. BBS helps to reduce the time lag between knowledge requiring and offering since they can communicate instantly. This important function ensures the motivation of the students while carrying out the tasks in town. By using the BBS system only, it is sufficient to complete the tasks with the existing functions of the PDA such as taking pictures and recording voices.
- (2) File upload function: As mentioned earlier, the teacher also uses the BBS to upload pictures and audios for verification and then those can be used as discussions and reference tools in the future. The function of being able to upload the images also keeps the student's motivation up as they can see the result of their upload immediately on the BBS interface.
- (3) Map for location detection: Each student is given a GPS with a PDA and a PHS (Personal Handy-phone System). The GPS sends signals to the server to update their current location. The teacher can view the student's location in the town from a map with their computer in the university. This is very useful to capture the learning status and task progress of each student based on his/ her current physical position.
- (4) Reduction of teacher's redundant work: The BBS also has a function to present the students with the next task. Students can access the BBS for the next task upon completion of the first task without asking the teacher repeatedly and reduces redundant processes. In the case, where a student can handle all the tasks independently, there is no need for using the BBS for communication at all as the teacher can always know the student's position and the student can upload information and access task automatically.
- (5) Contents and history log: The pictures and voice recorded is kept for further reference. History logs of the student's movement on the GPS and chat history on the BBS are also kept. All of this becomes useful reference for further study and discussion. The log history and data saved and kept is for eliminating redundant processes and avoid the reinventing the wheel. Also, the system provides the keyword search function to ease searching.

### 1.2 Map Window Interface

When the students are asked to carry out tasks in a town, each of them is given a GPS as explained above. The GPS will send the location signals to the map via the server and displayed on the map window. As in Figure 1, the teacher can view any of the students or all of the students' current position for selected time duration on a selected date.

This allows the teacher to immediately identify the positions of the students while they are in town. After the teacher enters the selection for position viewing, the student's position and trail with flow taken can also be seen on the map. In addition, the map allows

the teacher to send messages to the students and also information linking to capture the learning status and activities of the students. A trace log of the student's movement is also saved in the server for future retrieval and reference.



Figure 1: Map window for teacher.

### 1.3 BBS (Bulletin Board System)

The BBS has been developed for with the basic function for students and teachers to communicate and interact. While carrying out tasks in town, the student will only use the BBS for interaction with the teacher. Additional functions have also been added to the BBS to ensure that students are able to get responses immediately and complete the tasks smoothly and on time. It is important to note that, all the interaction between the teacher and the students are done through this single interface for more user friendliness.

- (1) Automatic new task assignment: Students are also able to obtain new tasks automatically upon login into the BBS and upon completion of a former task, students need to only click on the “Task Complete” button for the next new task. The teacher using XML in Java creates tasks beforehand. Also, different levels for different students have been set before the trip and thus, this helps to reduce the teacher's burden when the students are out in town carrying out the tasks. Explanation on how XML is used for this function is explained in the next section.
- (2) Uploading of pictures and audio: Upload and view function is available on the BBS interface. This allows viewing and sharing or discussion after the trip. Additional display function is embedded for ease of access and viewing.
- (3) Accessibility from the map window: The BBS is also accessible from the map window on the teacher's side for sending messages to one student or all students at one time as will be explained in the next section. This helps to save the time needed for the teacher when he or she needs to speak to all of the students at the same time.
- (4) Three levels of difficulty for tasks: Personalization for users based on their language ability and tasks is created in this system. Since every student's language ability varies, each of them will be asked to do tasks based on their command of language.

### 1.4 Supporting new task assignment

One of the main features of this system is the task assignment function. This function is developed to aid the teachers in supporting the students when they are out in the town completing tasks. With this automated function, the teacher does not need to spend additional time to give the next tasks for students.

XML [1] is very useful and convenient because it allows its users to define their own tags. Its primary purpose is to facilitate the sharing of structured data across different system and structure. In this case, the tags for the tasks are the same except for the contents. Also, since only simple tags are used, it is very simple for the teachers to just modify the contents of the tasks while keeping the tags constant across the system. In this system relevant task are given to the students according to their current level of Japanese Language ability. The teacher determine the level beforehand so that beginner students are not given advanced level tasks and vice versa.

The tags used and their explanations are as follows; “task id” is used as the number for the task, “place” indicates the place or destination where the task has to be carried out, “task” is the placeholder for the task content, “flag” indicates whether the task has been completed successfully or not and “level” shows the difficulty level of the task given out by the teacher. This is selected from advance, intermediate or beginner. A portion of the XML file is as shown as a sample program below:

```
<task id="1">
  <place> Tokushima Prefecture Museum </place>
  <task> Please ask about the opening hours of the museum
        and also the entrance fee. </task>
  <flag> false </flag>
  <level> advance </level>
</task>
```

The teacher also provides the foreign student’s profile as below. The tag “level” shows the level of the student’s Japanese language, which includes three options: advance, intermediate or beginner. Using this tag, the appropriate task is selected. “move” tag denotes how the student moves to another place. The value of this tag is either “by bicycle” or “on foot”. According to this tag, the time for the movement for another task is calculated.

```
<student id="5">
  <name> Mr. X </name>
  <nationality> China </nationality>
  <level> intermediate </level>
  <move> by bicycle </move>
</student>
```

Figure 2 shows the decision tree in order to help the teacher to decide the next task based on the XML files of the students and the tasks, and the student’s current information to ensure a smooth process of this activity. The decision tree has the following criteria:

- (1) Transportation method of the student: Using the student’s profile, the system will determine if the student is moving on foot or by bicycle. It is important to know the distance and time averagely taken to complete a task.
- (2) Levels and Language ability: Based on the language ability of the student and the level of the task difficulty (advance, intermediate or beginner), this system finds the candidates for the next task. For example, the system will not give an advance task to a beginner student. Although a beginner student will not be given a task for an advanced student, an intermediate student can challenge the task.
- (3) Differentiation of tasks: For the purpose of learning to be independent in town using Japanese language, this system makes sure that the tasks given out to every student are located in different places with different task. This is to make sure that the

foreign students will not meet their classmates in town and to avoid discussions among themselves.

- (4) Time limitation: A time limit is set in the system while the tasks are carried out in town. In the system developed, each student is given 2 hours to carry out the tasks, for instance. They have to come back to the university within the time allocated.
- (5) Student's current location: Information on the current position of the students and the distant from the destination where the task should be carried out is also taken into account when dividing tasks to the students. This means that tasks are determined according to the location of the tasks and the student's location.

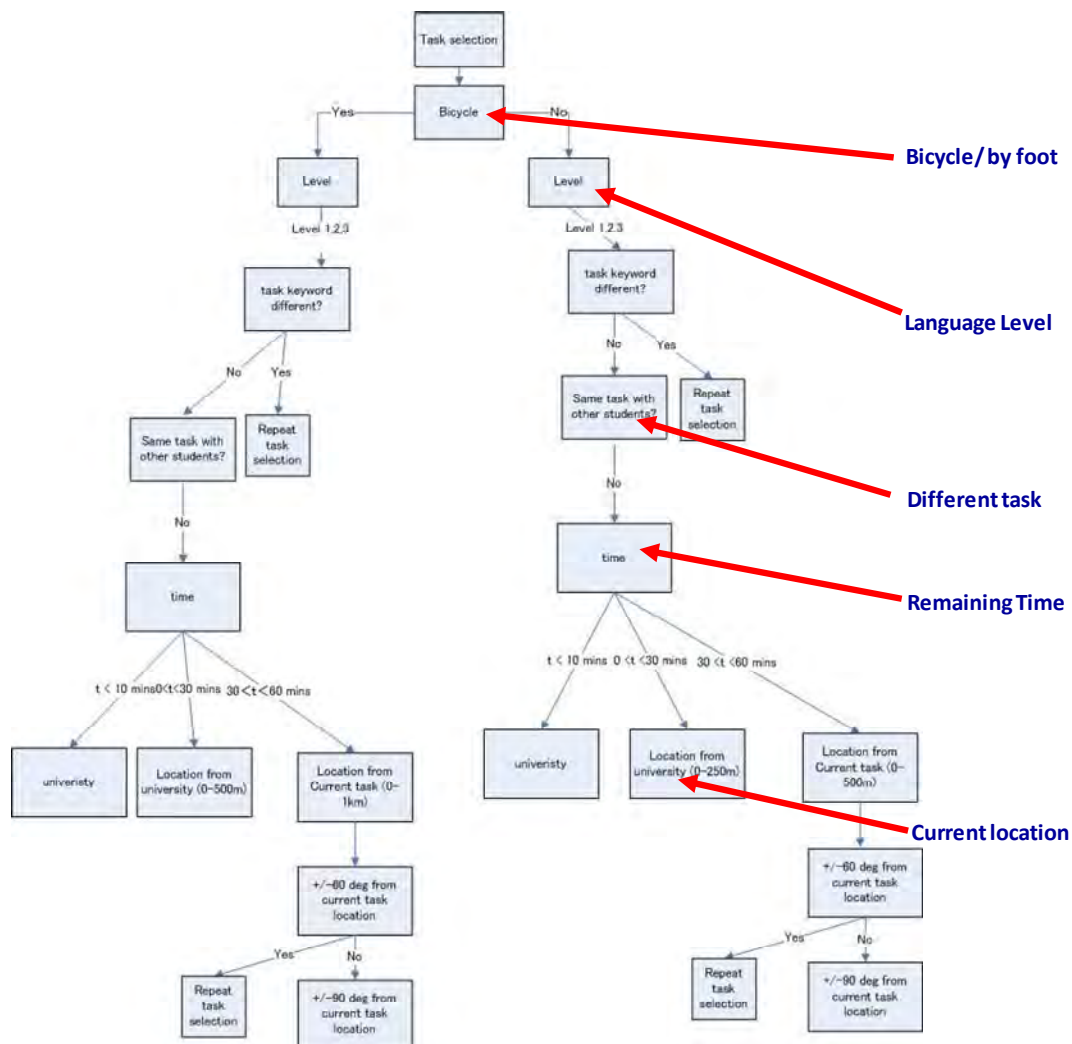


Figure 2: Decision tree for the task assignment.

When a student completes a task assigned, he/she can click on the “Task complete” button on the BBS to access to the next task. Then the system will be triggered to determine the next task according to the decision tree and to send out the next task to the student automatically without asking the teacher to type messages concerning the next task. The teacher can know whether a student has completed a task or not from the BBS. Then, anytime during the activity, the teacher can give another task to the students. The BBS on the teacher's side will show the current task ID being carried out and also the status of the completed tasks by the students. This function helps in reducing the redundant process of task creation and gives more time for the teacher to pay attention to students if they face any problems in town. Time saved by this automated process allows more frequent communication between the teachers and students in Japanese language.

## 2. Evaluation

### 2.1 Evaluation Method

This system has been evaluated and used 5 times for the past 4 years. The most recent evaluation of this system was conducted and participated by five foreign students between 20 and 35 years old who have gone through a six-month Japanese Language intensive course at the University of Tokushima. The students (from Spain, South Africa, Mexico, Peru and Thailand) had different levels of expertise in the usage of computer devices. In addition, one Japanese language teacher of this course was involved in this activity.

To ensure the familiarity of the students with the devices, a hands-on session was conducted one week before the actual system evaluation. The PDAs with the devices were distributed with a system usage manual for them to get acquainted with the system. The Japanese Language teachers created tasks for the students, which include activities like: “Go to the tourist information stand in Tokushima Station, and enquire about the places you can visit in just one day. Record the answer from the clerk and send it back”; or “Go to the Tokushima Museum, and enquire about the opening hours and entrance ticket. Bring back the schedule and send the recording of the interview” and so on. Students went to the town and asked somebody in the street for directions to arrive at their destination.

After the evaluation, there is a discussion and reflection session. All students gathered in a classroom together and the teacher facilitated the discussion about their experiences. This session has two main goals; to discuss the contents of the trip and the difficulties faced in using Japanese and strategies to solve the problems faced. Since each task designed in the trip has a specific purpose they can see the results collected from the trip and observe if the goals are achieved or not. The students can talk about what they have been learned and how to improve when they will face with the similar situations again. It is an open discussion and students can comment about the trip. Lastly, the students were asked to answer a questionnaire for their comments and feedback about the system. They had to assign a score from 1 to 5 to each one of the following four questions (1- lowest score and 5- highest score). In addition their comments about the advantages and disadvantages of the system, and feedback/ suggestions were also asked.

**Table 1: Result of Questionnaire**

Question	Ave	SD
(1) Do you think the system was exciting?	5.0	0.0
(2) Do you think the time given to complete the task sufficient?	5.0	0.0
(3) Do you think the PDA was easy to use?	3.0	1.2
(4) Do you want to use the system again?	4.0	1.4

### 2.2 Result and feedback

Table 1 shows the results of the questionnaire and the standard deviation for each set of answers. According to question Q1 and Q4, the students enjoyed the experience and would like to use the system again. Opinions were divided when asked about the time allowed to complete the tasks, as illustrated by Q2. Some students commented that they could go back to the classroom within the time limit according to the appropriate task assignment from the system. Similarly, some students found the PDA was easier to use than others (Q3); this is partly related to their level of expertise using computational devices, and to the fact that the operating system was in Japanese. In addition, the students

had to change the battery during the trip but they didn't know well how to change it. Therefore, more training for using PDA will be needed. Finally, they found the PDA to be helpful when confronted with situations that aroused doubts or questions to bring back to the classroom, or were uncertain about the goals of their task. Actually, they commented that this activity was very interesting because they could talk about life in Tokushima with local people in Japanese.

From the questionnaire and comments of the evaluation, some conclusions can be made. Due to the nature and size of the PDA, there were restrictions in terms of battery life, ease of inputting words and connection speed. We also observed that there were problems with the GPS for two students. Some positive comments were that the system was interesting as it was like an orienteering activity and the interactivity of the system was useful in learning. Students were also glad that immediate response was obtained when problems were faced in town concerning the task. The teacher also appreciated the automatic task assignment function so that she could spend more time for the communication with the students.

### 3. Conclusions

This paper described the LOCH system for mobile language learning with PDA. Since timeline is important in language learning, task assignment function applied. It helped to ensure the smooth response and keep up the motivation of users in the system. In future work, we are planning to create a game based activity to sustain student's motivation. In addition, we will extend the system which can be available at anytime. The experiences and knowledge gained by the students in the One Day Trip system is very valuable. To be able to do reflection more deeply and minutely, this function records the learning experiences that the student and the teacher did. Furthermore, the success and the failure stories are recorded. The students and teachers can reflect that when, where, what problem happened, and the information shared can be used for future study.

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