

JAPELAS: Supporting Japanese Polite Expressions Learning Using PDA(s) Toward Ubiquitous Learning

Summary

It is very difficult for overseas students to learn Japanese polite expressions because these expressions change in a complicated manner according to context, for instance, hyponymy, social distance, and the formality of the conversational situation.

Moreover, the notion of social distance in Japan often differs from that in the learner's country. This difference may result in misunderstanding by overseas students. Therefore, it is very important for Japanese language learners to learn the social situation in Japan in order to use polite expressions properly. We have implemented a personal digital assistant (PDA)-based language-learning support system for Japanese polite expressions learning, called Japanese polite expressions learning assisting system (JAPELAS).

Keywords: *Computer Assisted Language Learning, Authentic Learning, Collaborative Learning, and Mobile Learning.*

1. Introduction

Ubiquitous computing will help organize and mediate social interactions wherever and whenever these contexts might occur [1]. Its evolution has recently been accelerated by improved wireless telecommunications capabilities, open networks, continued increases in computing power, improved battery technology, and the emergence of flexible software architectures [8]. With these technologies, the learning environment called Computer Supported Ubiquitous Learning (CSUL) can be embedded in everyday life [11-14].

The main characteristics of the CSUL environment are as follows [3,4]:

(1) Permanency: Learners can never lose their work unless it is deleted purposefully. In addition, all learning processes are recorded continuously.

(2) Accessibility: Learners have access to their documents, data, or videos from anywhere. That information is provided based on their requests. Therefore, the learning involved is self-directed.

(3) Immediacy: Learners can get information from anywhere immediately. Therefore, learners can solve problems quickly. They may record the questions and look for the answer later too.

(4) Interactivity: Learners can interact with experts, teachers, or peers in the form of synchronous or asynchronous communication. Hence, the experts are easily reachable and the knowledge is more readily available.

(5) Situated-ness: The learning can be embedded in our daily life. The problems encountered as well as the knowledge required are all presented in natural and authentic situations. This helps learners notice the features of problem situations that make particular actions relevant.

Moreover, this learning environment can employ Computer Supported Collaborative Learning (CSCL) that focuses on the socio-cognitive process of social knowledge construction and sharing based on social interaction [15].

The challenge in an information-rich world is not only to make information available to people at any time, at any place, and in any form, but specifically to say the right thing at the right time in the right way [6]. This computing environment enables learning at any time and any place. However, the fundamental issue is how to provide learners with the right information at the right time in the right way. This paper tackles the issues of right time and right place learning (RTRPL) in a ubiquitous computing environment.

This paper proposes the context-aware language-learning support system called Japanese polite expressions learning assisting system (JAPELAS). Users of this system are overseas students of universities in Japan, and want to learn the Japanese Language. In this system, the students always use personal digital assistants (PDAs), and JAPELAS provides the appropriate polite-expression in context (see figure 1). We assume that, in the future, people will wear tiny computers, like an active badge system [20], although we are using PDA(s) currently. Therefore, JAPELAS might be embedded into those small computers and enable ubiquitous learning.

It is very difficult for overseas students to learn Japanese polite expressions because the expressions change in complicated ways according to the context, for instance, hyponymy, social distance, and the formality of conversation. Moreover, the notion of social distance in Japan often differs from that in the learner's country. This difference may result in misunderstanding by overseas students. Therefore, it is very important for the learners to learn the social situation in Japan in order to use proper polite expressions accordingly. This paper describes the elements that cause changes in polite expressions, how the system has been developed, and the initial experimental phase of this system.

Previously, Yano and Ochi [18,19] developed a knowledge-base system for Japanese polite expression learning, called the Japanese Expressions Dictionary (JEDY) system. The JEDY system is an online dictionary intended to support learning of the changes in polite expressions in different situations. After the user inputs the information about the conversation partner, the relationship, and the situation, JEDY shows the learner appropriate examples for that situation. In order to construct an understanding of language, however, conversation with other people in daily life is very important. Therefore, this paper tackles context-aware support in everyday conversation without any input of the context information.

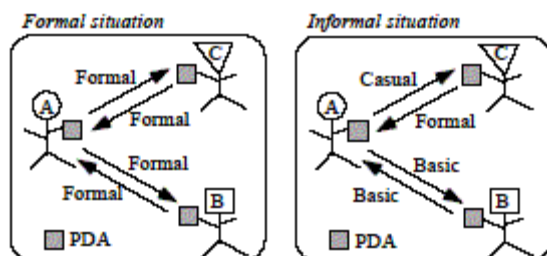


Figure 1: Overview of JAPELAS.

2. Computer-supported Mobile Learning

Many studies have examined wireless mobile learning. According to [16,17], “90% of teachers in a study of 100 palm-equipped classrooms reported that handhelds were effective instructional tools with the potential to impact student learning positively across curricular topics and instructional activities.” This paper discusses three categories of mobile devices in education: classroom response systems, participatory simulations, and collaborative data gathering tools. ClassTalk [<http://www.bedu.com>] is a classroom response system that shows teachers the statistics of students’ answers in the classroom immediately. ThinkingTag enables some participatory simulation, such as ‘ants swarm’ [5]. As a data gathering tool, the bird watching assistance system [3] and Digital-EE II [10] were developed for supporting the learning environment.

JAPELAS falls into the participatory simulations and collaborative data gathering tools categories. JAPELAS allows participatory simulation in that learners play roles in different kinds of social situations. The learners learn how to change the level of politeness in different social situations. As a collaborative data gathering tool, JAPELAS collects and shares polite expressions and social situations based on the experience of learners. However, a system that helps language learning has not yet been proposed. Ubiquitous Computing can be also called context-aware and ubiquitous computing. Therefore, this technology can be very helpful for language learning because language is highly related to context and situation.

This research is advocated by pedagogical theories such as on-demand learning, hands-on learning, and authentic learning. Brown, Collins, and Duguid [2] define authentic learning as coherent, meaningful, and purposeful activities. When classroom activities are related to the real world, students receive great academic rewards. There are four types of learning to ensure authentic learning: action learning, situated learning, incidental learning, and experimental learning [7]. These learning forms can be very helpful for language learning. As for the comparison between dictionary-based learning and authentic learning, Miller and Gildea [9] worked on vocabulary teaching, and described how children are taught words from dictionary definitions and a few exemplary sentences. They have compared this method with the way vocabulary is normally learned outside school. People generally learn words in the context of ordinary communication. This process is startlingly fast and successful. We believe authentic learning is very important so that learners construct an understanding of the language in everyday life.

3. Japanese polite expression

Generally, the four skills (reading, writing, hearing, and speaking) are the main objectives in language learning. However, another main objective for the learner is correctly using proper honorific expressions, especially because of the particularity of Japanese. Therefore, in order to have good communication with native speakers, it is more and more important to learn not only the vocabulary, pronunciation and grammar of the target language, but also the culture of the language speakers.

In Japanese language learning, polite expressions are closely related to Japanese culture. That is to say, the use of polite expressions is one of the most important parts of Japanese language and is an indication of an individual’s education or whether the individual is competent for his/her job, for example. In Japan, the first step toward showing job competence is the proper use of polite expressions. Improper use of polite expressions might lead to misunderstanding in conversation, for instance, because (1) the speaker cannot understand his counterpart’s social

situation or (2) the speaker cannot apply the correct Japanese polite expressions corresponding to the occasion. Therefore, a solid understanding of the context of a conversation is very important in Japanese society.

3.1 Level of politeness

Japanese polite expressions are divided into two types: honorific expressions and humble expressions. The former is used to express a speaker's respect for a conversational companion. The latter is used to express the humble attitude of a speaker. For example, the honorific form of the word "hanasu" is "ossharu", and the humble form is "mousu". The alteration of Japanese polite expressions usually occurs in the verb, noun, adjective, or adverb. Moreover, there are three polite expression levels (PELs): casual, basic, and formal.

Table 1 shows an example of PEL. There are two patterns. The first is an irregular change to a different word, and the second is a regular change incorporating a prefix and/or suffix. There are no limitations or patterns to irregular verbs. Usually, overseas students learn only about the changes of basic forms in Japanese class. However, the abnormality of polite expressions makes these students feel that learning Japanese well is very difficult.

Table 1: Level of Japanese polite expressions and its example.

Level	Example (Please come.)
Casual	食べる(食う)
Basic	食べます
Formal	食べられます・いただきます
More Formal	お食べになります・召し上がります

Table 2: Factors of changes in Japanese polite expressions.

Factor	Elements
Hyponymy	affiliation, age, position (social status)
Social distance	colleague, friends, relatives
Formality	ceremony, party, meeting (scene)

Table 3: Hyponymy rule.

Affiliation	Position	Age	Hyponymy
Same (group, department, or organization)	Upper	Any	Upper
	Same	Upper	Upper
	Same	Same or lower	Same
	Lower	Any	Lower
Different	Upper	Any	Upper
	Same	Same or lower	Same
	Lower	Any	Lower

Table 4: Social distance rule.

Affiliation	Social relation	Social distance
Same	Any	Inside
Different	Relatives, friend	Inside
	Others	Outside

Table 5: JAPER rule.

Formality	Hyponymy	Social distance	Level of PL
Formal	Any	Any	More formal
	Any	Outside	Formal
Informal	Upper	Inside	Formal
	Same	Inside	Basic
	Lower	Inside	Casual

3.2 Factors of changes in Japanese polite expression

There are three factors of changes in JAPERLAS (Table 2).

(i) Hyponymy: Generally, people usually use a term of respect to elder or people of a higher social status. Social status depends on affiliation, length of career, age, etc.

(ii) Social distance: Japanese polite expressions are often expressed in the familiar sense. However, the familiar

sense is often different from country to country. For example, the Japanese familiar sense is narrower than the American familiar sense. The Japanese familiar sense depends on social relationships, which are classified into an inside group and an outside group. If the relation is family or colleague, then the listener is considered to be a member of a group and a casual level of polite expression is used. If the relation is not so close, people use formal expressions.

(iii) Formality: The situation of a conversation influences polite expressions. For example, Japanese people often use more formal expressions in formal situations (giving a talk at ceremonies, writing letters, and so on).

There are other factors, which are not covered in this paper. For example, if one wants to ask something troublesome to someone else, s/he will use a polite expression, even if the position of the listener is lower. On the other hand, s/he will use less polite expression in giving directions to the lower person. In the future, the influence of intention will be studied.

3.3 Rules for changes in Japanese polite expression

The learner must understand not only vocabulary but also the situations in which to use the correct polite expression. This paper proposes the Japanese polite expression rule (JAPER) to provide an appropriate level of expressions (formal, basic, or casual) according to the situation (see Table 5). JAPER consists of a social distance rule and a hyponymy rule. The hyponymy rule derives the relation of the social standing between the speaker and the listener focusing on their affiliation, position, and age. The social distance rule derives the degree of intimacy focusing on their affiliation and friendship. In JAPER, the formality is divided into "formal" and "informal". Finally, JAPER derives the level of polite expressions: more formal, formal, basic, and casual.

4. Implementation of JAPELAS

We have developed a prototype system of JAPELAS on a PDA (Toshiba Genio-e550C) with Pocket PC 2002, IR (infrared) data communication port, RFID (Radio Frequency Identification) tag reader/writer, GPS, and wireless LAN (IEEE 802.11b). The program has been implemented with Embedded Visual C++ 3.0.

4.1 System configuration

As shown in figure 2, JAPELAS has the following modules:

(1) Learner model: This module has the learner's profile, such as name, age, gender, year in school, friends, relatives, etc. In addition, this model deals with the comprehensive level of each expression. Before using this system, each learner enters these data. In addition to this explicit method, JAPELAS detects the learner's comprehension during system use. Moreover, the system records the information of the other learners whom the learner has met. The learner can use this information for individual learning. By selecting someone as a conversational partner, the learner can learn polite expressions alone through the simulation.

(2) Environmental model: This module contains data on rooms in a certain area. The room is detected in the location manager using an RFID tag and the GPS. The location is used to determine the formality. For example, meeting rooms are included among formal situations. If the learner enters a meeting room, more formal expressions are provided there without reference to hyponymy or social distance.

(3) Educational model: This module manages expressions as learning materials. The teacher enters the basic expressions. Both learners and the teacher can add or modify expressions during system use.

(4) IR communication: IR requires no fixed infrastructure and no configuration. In addition, IR simplifies the designation of communication targets. Instead of entering target names, users can point to the person.

(5) Location manager: Using RFID tags and GPS, this module detects the learner's location, e.g. store, private room, home, etc. RFID tags are used indoors, whereas GPS is used outdoors. RFID tags are attached to the entrance doors of each room to identify the rooms.

(6) Polite expression recommender: Based on polite expression rules, this module provides appropriate expressions for each situation.

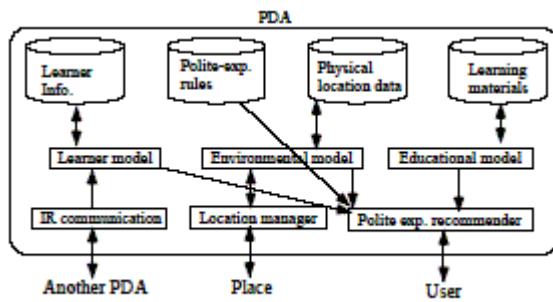


Figure 2: System Configuration.

4.2 User Interface

As shown in figure 3, the users inputs their individual personal data, e.g., name, gender, work, age, relationship etc. When the user talks to a conversational partner, the system gets the information for the person via the infrared data communication of the PDA, as shown in the settings window (A), and then suggests a suitable polite expressions for the user, as shown in the expression window (B). In this case, the system recommends the user to use formal or more formal expressions. The data of the partners is stored into the database in order to facilitate personal learning. The user can select one person from the database and can simulate conversation.

Figure 4 shows a scene of learning polite expressions with JAPELAS. Every user has a PDA and inputs his/her information into the database, e.g., name, grade, age, etc. When Mr. X talks to Mr. Z, the system presents a casual expression to Mr. X, because Mr. X is older than Mr. Z. On the other hand, when Mr. X turns to Mr. Y in order to talk, the system presents a formal expression to Mr. X, because the year of Mr. X is lower than the year of Mr. Y.

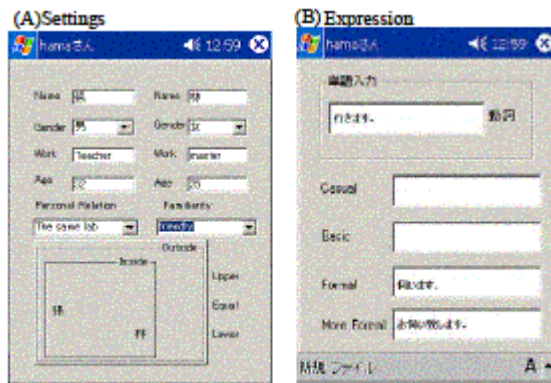


Figure 3 User interface of JAPELAS.

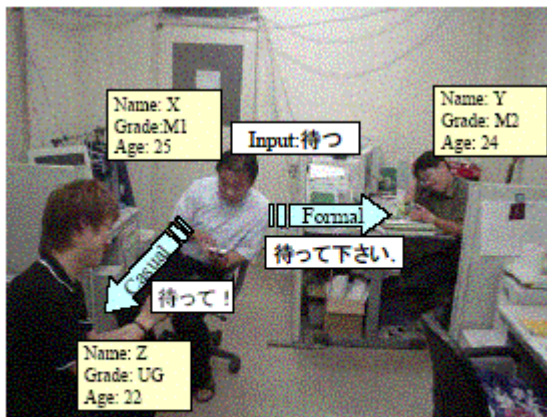


Figure 4 A usage scene of JAPELAS.

4.3 Usage settings

There are two settings in which learners use JAPELAS, as shown in Table 6. First, JAPELAS is used in classrooms. This environment employs two forms of authentic learning, viz. action learning and experimental learning, based on face-to-face and human-to-human communication. In this collaborative learning environment, teachers divide students into groups of three or four and assign roles and situations to the students. The students then learn polite expressions by role-playing, and the situations are reversed later. For example, one learner acts as a guest in a store, and another performs a sales assistant. The sales assistant must speak more formally.

Secondly, learners use this system in their everyday life. Situated learning and incidental learning are employed in this setting. For example, if a learner has a job of a shop assistant, s/he might learn more formal expressions by herself/himself, based on situated learning. In addition, if the learner writes a greeting letter to a teacher, s/he might learn some formal expressions incidentally.

Table 6 Characteristics of two usage settings.

	<i>Learning in classrooms</i>	<i>Learning outside classrooms</i>
Learning theory	Action learning and experimental learning	Situated learning and incidental learning
Learning situation	Specified by teachers	Embedded in daily life

5. Experiment

We arranged to have 18 Japanese students and 10 overseas students to evaluate JAPELAS using a questionnaire. All of the Japanese users were high school students (16 boys and 2 girls; average age: 16.9 years). All of the overseas students were taking a Japanese language course before entering a master's or doctoral course at a university. The overseas students were from China, Korea, Mexico, Kenya, Indonesia, Argentine, Bangladesh, and Egypt (average age: 28.9 years). Nine students were taking a beginner level course, and one student was taking an intermediate level course for Japanese language learning. Two different Japanese teachers taught the courses. Although none of the Japanese or foreign students owned PDAs, 56% owned computers.

The user played such roles as teacher, elder brother, father or guest as a task given by us. The situations and tasks are shown in Appendix 2. The user played one role among these, walked into the room, and randomly assigned pairs for the conversation (see figures 5 and 6). Before using this system, the students learned Japanese polite expressions, which were entered into the system. When the user begun the conversation, JAPELAS helped him/her to use the correct polite expression. The user could sometimes change roles, and JAPELAS was used for 30 minutes.

After the experiment, the users evaluated the system by nine questions, which were graded on a scale, with one being the lowest and five being the highest. The average score given by Japanese students was 3.8, and the average score given by overseas students was 4.0. Table 7 shows the results of the evaluation by the questionnaires. The results for Question (1) indicate that the system provided appropriate information for the users. The results for Question (2) reveal the importance of adequately explaining how to use this system. In the first experiment, before we provided a good explanation, we did not get good feedback from the Japanese students. However, after having explained the system to the overseas students, the system received a better ranking. Therefore, an explanation of this system is very important.

In terms of language learning, the results for Question (3) indicate that this system was quite useful. A learner commented that the system made understanding the appropriate level of politeness easy by changing roles and situations. The results for Question (4) indicate that we should increase the response of the system. Questions (5) and (6) indicate that users were very interested in this system and would like to continue using it. Most of learners commented that they could learn how to use polite expressions using this system.

In Japan, a growing number of young people are unable to use appropriate polite expressions, so that this system may be useful even for young Japanese.



Figure 5 A scene of the experimentation for Japanese students.



Figure 6 A scene of the experimentation for overseas students.

Table 7 Results of questionnaire.

Questionnaire	#1	#2
Q1 Did this system provide appropriate polite expressions?	4.1	3.9
Q2 Do you think this system easy to use?	3.1	4.0
Q3 Do you think this system useful for language learning?	4.1	3.9
Q4 Is the response of this system is adequate to use?	3.3	3.9
Q5 Do you think this system very interesting?	4.1	4.1
Q6 Do you want to keep using this system?	4.1	4.4

#1: the average of the Japanese students.

#2: the average of the overseas students.

Teachers commented that learning the Japanese language is very difficult due to the relative level of politeness, which other languages do not have. However, JAPELAS is very useful because the system automatically provides

the correct relative level of politeness as derived from the personal information and the situation.

7. Conclusions

This paper described a context-aware language learning support system, called JAPELAS, for Japanese polite expressions learning. JAPELAS provides the correct polite-expression based on hyponymy, social distance, and situation through the identification of the target user and the location. The experiment showed that JAPELAS was very useful for learning Japanese polite expressions.

In practical use, the system might interrupt human-to-human interaction, because it requires the user to input the verb s/he wants to speak. Therefore, in the future, we will try to adapt a natural language interface to detect the verb without any input from the user. In addition, a software agent will be introduced as conversational partners. The agent will enable collaborative learning when learner is alone. Moreover, formality should be detected from not only location but also the learner's schedule. For example, meetings are not always held in conference rooms. These are subjects for continued study.

References

- [1] Abowd, G.D., and Mynatt, E.D.: Charting Past, Present, and Future Research in Ubiquitous Computing, ACM Transaction on Computer-Human Interaction, Vol.7, No.1, pp.29-58,2000.
- [2] Brown, J. S., Collins, A., and Duguid, P.: Situated Cognition and the Culture of Learning. Educational Researcher, (Jan.-Feb.), pp.32-42, 1989.
- [3] Chen, Y.S., Kao, T.C., Sheu, J.P., and Chiang, C.Y.: A Mobile Scaffolding-Aid-Based Bird -Watching Learning System, Proceedings of IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE'02), pp.15-22, IEEE Computer Society Press, 2002.
- [4] Curtis, M., Luchini, K., Bobrowsky, W., Quintana, C., and Soloway, E.: Handheld Use in K-12: A Descriptive Account, Proceedings of IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE'02), pp.23-30, IEEE Computer Society Press, 2002.
- [5] Colella, V., Borovoy, R. and Resnick, M.: Participatory simulations: using computational objects to learn about dynamic systems, Proc. of CHI 98, pp.9-10 (1998).
- [6] Fischer, G.: User Modeling in Human-Computer Interaction, Journal of User Modeling and User-Adapted Interaction (UMUAI), Vol. 11, No. 1/2, pp 65-86, 2001.
- [7] Hwang, K.S.: Authentic Tasks in Second Language Learning, <http://tiger.coe.missouri.edu/~vlib/Sang's.html>
- [8] Lyytinen, K. and Yoo, Y.: Issues and Challenges in Ubiquitous Computing, CACM, Vol. 45, No. 12, pp.63-65, 2002.
- [9] Miller, G. A., and Gildea, P.M.: How children learn words. Scientific American, No.257, pp.94-99, 1987.
- [10] Okada, M., Yamada, A., Tarumi, H., Yoshida, M. and Morita, K.: Digital-EE II: RV-augmented interface design for networked collaborative environmental learning, Proc. of CSCL 2003, pp.265-274, 2003.
- [11] Ogata, H., and Yano, Y.: How Ubiquitous Computing can Support Language Learning, Proc. of KEST 2003, pp.1-6,2003.
- [12] Ogata, H., and Yano, Y.: Supporting Knowledge Awareness for a Ubiquitous CSCL, Proc. of e-Learn 2003, pp.2362-2369 (2003).
- [13] Ogata, H., and Yano, Y.: Knowledge Awareness Map for Computer-Supported Ubiquitous Language-Learning, Proc. of IEEE WMTE 2004, pp.19-26, (2004).
- [14] Ogata, H., and Yano, Y.: Context-Aware Support for Computer Supported Ubiquitous Learning, Proc. of IEEE WMTE2004, pp.27-34, (2004).
- [15] O'Malley, C.: Computer supported collaborative learning, NATO ASI Series, F: Computer & Systems Sciences, Vol.128, 1994.
- [16] Roschelle, J., and Pea, R.: A Walk on the WILD Side: How Wireless Handhelds May Change CSCL, Proc. of CSCL 2002, pp.51-60, 2002.
- [17] Tatar, D., Roschelle, J., Vahey, P., and Penuel, W.: Handhelds Go to School: Lessons Learned, IEEE Computer, pp.30-37, Sep. 2003.
- [18] Yano, Y. and Ochi, Y.: Design and Evaluation of Example-deriving Knowledge-base System for Japanese Polite Expressions Learning, Proc. of ICCE99, pp.566-573, 1999.
- [19] Yano, Y. Murata, R., Ochi, Y., and Hayashi, T.: JECY: CAI System for Japanese Polite Expressions, Trans. of Japanese society of Information and Systems in Education, Vol.14, No.2, pp.105-112 (1997). (in Japanese)
- [20] Weiser, M.: Some computer science issues in ubiquitous computing, Communications of ACM, Vol.36, No.7, pp.75-84 (1993).