

Original paper

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

Chengjiu Yin, Hiroaki Ogata, Yoneo Yano, Yasuko Oishi

Summary

It is very difficult for overseas students to learn Japanese polite expressions because the expressions change in complicated way according to the context, e.g. hyponymy, social distance, and the formality of conversation scenes. Moreover, the feeling of social distance in Japan often varies from that in a learner's country. This difference may result in misunderstanding for the overseas students. Therefore, it is very important for the learners to learn the social situation in Japan, and to use polite expressions properly accordingly. We have implemented a PDA (Personal digital Assistant)-based language-learning support system for Japanese polite expressions learning, which is called JAPELAS (Japanese polite expressions learning assisting system).

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 those technologies, the learning environment called CSUL (Computer Supported Ubiquitous Learning) can be embedded in the real everyday life [11-14].

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

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

(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: Wherever learners are, they can get any information immediately. Therefore, learners can solve problems quickly. Otherwise, the learner may record the questions and look for the answer later.

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

(5) Situated-ness: The learning could be embedded in our daily life. The problems encountered as well as the knowledge required are all presented in the nature and

authentic forms. It 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 people learning at any time and any place. However, the fundamental issue is how to provide learners 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.

Especially, this paper focuses on learning polite expressions in Japanese as an application domain of CSUL, because Japanese polite expressions are much influenced by situations. This paper proposes the context-aware language-learning support system called "JAPELAS (Japanese Polite Expressions Learning Assisting System)." Users of this system are overseas students of Universities in Japan, and want to learn Japanese Language. They always use PDA (Personal Digital Assistant), and JAPELAS provides the learners the appropriate polite-expression in the context (see figure 1). In the future, we assume that people wear tiny computers like active badge system [20], although we are using PDA(s) currently. Therefore, JAPALAS 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 way according to the context, e.g. hyponymy, social distance, and the formality of conversation scenes.

Moreover, the feeling of social distance in Japan often varies from that in a learner's country. This difference may result in misunderstanding for the overseas students. Therefore, it is very important for the learners to learn the social situation in Japan, and to use polite expressions properly accordingly. This paper describes the elements that cause the changes of the polite expressions, how the system has been developed, and the initial experimentation of this system.

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

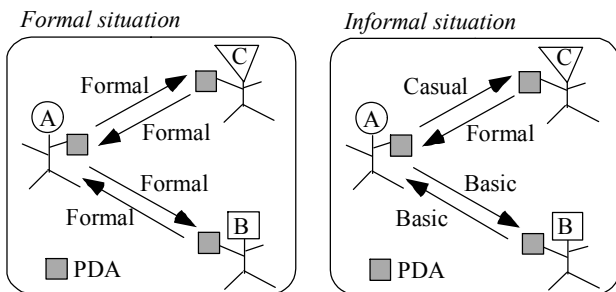


Fig. 1: Overview of JAPELAS.

2. Computer Supported Mobile Learning

Many researches have been done on the 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 shows three categories of mobile devices in education; classroom response systems, participatory simulations, and collaborative data gathering tools. ClassTalk [http://www.bedu.com] is one of classroom response systems that show teacher the statistics of the students’ answers in the classroom immediately. The ThinkingTag enables some participatory simulation such as ants swarm [5]. As a data gathering tool, the bird watching assisting

system [3] and Digital-EE II [10] were developed for supporting to learn environment.

JAPELAS falls into participatory simulations, and collaborative data gathering tools. JAPELAS allows participatory simulation in the way that learners play a role in a different kind of social situations. The learners learn how to change the level of politeness in the different social situations. As a collaborative data gathering tool, JAPELAS collects and shares polite expressions and social situations based on their experience. However, the system that helps language learning has not 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 much related with 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 the classroom activities are related to the real world, students receive great academic delights. There are four types of learning to ensure authentic learning: action learning, situated learning, incidental learning, and experimental learning [7]. Those learning forms could 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, learning the four skills (reading, writing, hearing, and speaking) are main objectives in language learning. It is a main aim of a beginner's class to learn honorific expressions especially for the learner's daily life. However, recently it is important to learn not only vocabulary, pronunciation and grammar of the target language, but also the cultural knowledge in order to have good communication with the native speakers. In Japanese language learning, polite expressions relate to Japanese culture closely. Using polite expressions, Japanese people usually adapt the manner of speaking to suit the situation. However, it is difficult for the overseas students to use the

polite expressions because these expressions change according to the context. If polite expressions are not used properly, they might sound comical and strange. Moreover, it might lead to misunderstanding in conversation. Therefore, it is very important for foreigners to have the solid understanding of the context of conversation.

3.1 Level of politeness

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

Table 1 shows an example of PEL and Japanese sentences. There are two kinds of changing patterns: the first one is irregular change to a different word; the second one is regular change incorporating with a prefix and/or postfix word. According to the former, there is no limitation and pattern like an irregular verb. The students usually learn only the basic form in a Japanese class. This makes Japanese expressions difficult for the overseas learners.

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

Level	Example (Please come.)
Casual	くう
Basic	食べる
Formal	召し上がる・いただく
More Formal	お召し上がりになる

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 of Japanese polite expression

There are three factors of changes in Japanese polite expressions (Table 2).

(i) Hyponymy: Generally, people usually use a term of respect to elder or superior people. Social status depends on affiliations, the length of career, age and so on.

(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 one. 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 they consider being inside a group and using a casual level of polite expressions. 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).

3.3 Rules for changes of Japanese polite expression

The learner must understand not only vocabulary but also the situations to use the right polite expression. This paper proposes JAPER (Japanese polite expression rule) to provide an appropriate level of expressions (formal, basic, or casual) according to the situation (see Table 5). JAPER consists of social distance rule, hyponymy rule, and JAPER (Japanese Polite Expressions rule. The hyponymy-rule derives the relation of the social standing speaker and the listener focusing on their affiliation, position, and age. The social distance rule derives a degree of

intimacy focusing on their affiliation and friendship. In the JAPER, the formality is divided into "formal" and "informal". Finally, the JAPER derives the level of polite expressions: more formal, formal, basic, and casual.

4. Implementation of JAPELAS

We have developed the 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 those data. In addition to the explicit method like this, JAPELAS detects learner's comprehensions during the system use. Moreover, this system records the information of the other learners whom the learner have 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 has the data of rooms in a certain area. The room is detected in the location manager using RFID tag and GPS. The location is used to determine the formality. For example, meeting rooms are included informal situations. If the learner enters a meeting room, more formal expressions are provided there without reference to hyponymy and social distance.
- (3) **Educational model:** This module manages expressions as learning materials. Teacher enters the basic expressions. Both learners and the teacher can add or modify expressions during the 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:** With RFID tags and GPS, this module detects the learner's location, e.g. store, private room, home, etc. RFID tags are used indoors, while GPS is for outdoors. RFID tags are attached in

the entrance doors in the room, and identify the rooms.

- (6) **Polite expression recommender:** Based on polite expression rules, this module provides the appropriate expression at the situation.

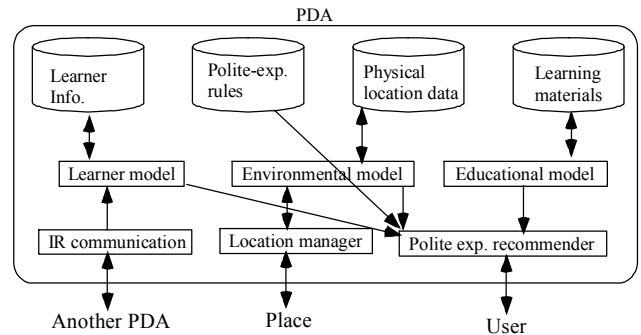


Fig. 3: System Configuration.

4.2 User Interface

As shown in figure 4, the users input 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 of the person via the infrared data communication of PDA as shown in (B) settings window, and then it suggests the suitable polite expressions for the user as shown in (A) expression window. 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 s/he can simulate the conversation.

Figure 5 shows a scene of learning polite expressions with JAPELAS. Every user has a PDA and inputs his information into the database, e.g., name, grade, age etc. When Mr. X talks to Mr. Z, the system tells Mr. X a casual expression. That is 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 tells Mr. X a formal expression. That is because the year of Mr. X is lower than the year of Mr. Y.

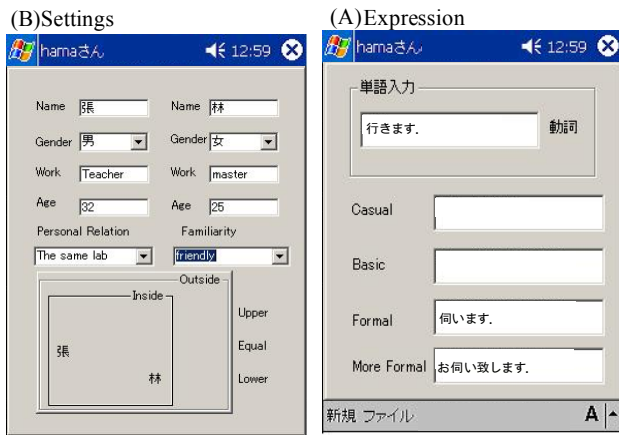


Figure 4 User interface of JAPELAS.

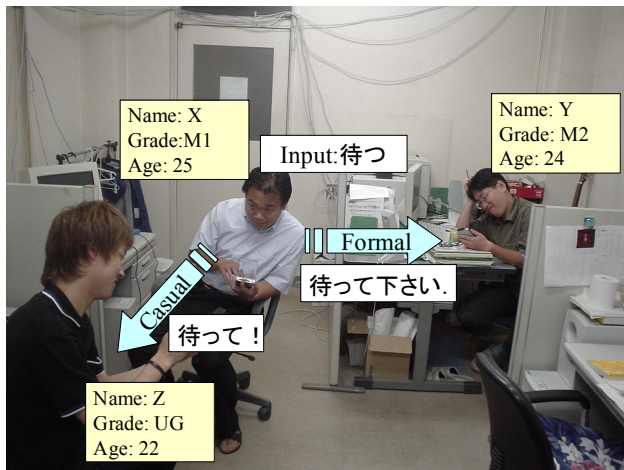


Figure 5 A usage scene of JAPELAS.

4.3 Usage settings

There are two settings where learners use JAPELAS as shown in Table 6. Firstly, JAPELAS is used in classrooms.

This environment makes a practice of action learning and experimental learning in authentic learning, based on face-to-face and human-to-human communication. In this collaborative learning environment, teachers divide students into some groups where the number of the member is three or four, give some roles and situations to students, and the students learn polite expressions by acting a role and changing situations. 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 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 learner writes a greeting letter to teacher, s/he might learn some formal expressions incidentally.

Table 6 Characteristics of two usage settings.

	<i>Learning in class-rooms</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. Experimentation

We arranged 18 Japanese students and 10 overseas students to evaluate JAPELAS with questionnaire. All the Japanese users were high school students; 16 boys and 2 girls; and the average of their age was 16.9. All the overseas students were taking Japanese language course before entering master course or doctor course of a University. They were from China, Korea, Mexico, Kenya, Indonesia, Argentine, Bangladesh, and Egypt; and their average age was 28.9. 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. Both of the Japanese and foreigners had no PDA. However, 56 percent of the users had their own computers.

The user played a role, e.g. teacher, elder brother, father, guest, etc who were given by us (see appendix 1). The situations and tasks were given to the users as shown in appendix 2. The user played one role of them, walked in the room, and randomly made a pair for the conversation (see figure 6 and 7). When the user begun the conversation, JAPELAS helped him/her to use the right polite expressions. The user could sometimes change the role, and totally used JAPELAS for 30 minutes.

After the experimentation, they gave a number between one and five to each of nine questions, with one being the lowest, and five being the highest. The average of the points of Japanese students was 3.8, and that of overseas students was 4.0. Table 7 shows the results of the questionnaire. According to Question (1), the system provided the appropriate information for the users. Question (2) does not obtain a good point. That is because this experiment was the first time for the all the users to use PDA. We explained the overseas students how to use it because the point of the Japanese student was not so good.

In terms of language learning, question (3) shows this system was quite useful for it. A learner gave a comment that this system was easy to understand the appropriate level of politeness by changing roles and situations. From the results of question (4), we should make the response of the system a little faster. Question (5) and (6) show the users were very interested in this system, and liked to keep using it. Most of learners commented that they could learn how to use polite expressions using this system.

In Japan, there is a social problem that some of young people cannot use appropriate polite expressions. Therefore, we found this system is very useful even for Japanese.



Figure 6 A scene of the experimentation for Japanese students.



Figure 7 A scene of the experimentation for overseas students.

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 it is very difficult that Japanese language has the relative level of politeness while other languages do not have. However, JAPELAS is very useful because the system automatically provides the right relative level of politeness by deriving from the personal information and the situation.

7. Conclusions

This paper described a context-aware language-learning support system for Japanese polite expressions learning, which is called JAPELAS. JAPELAS provides the right polite-expression that is derived from hyponymy, social distance, and situation through the identification of the target user and the place. The experiment showed JAPELAS was very useful to learn Japanese polite expressions.

As for the future work, this system requires the user to input the verb s/he wants to speak. Therefore, we will try to adapt natural language interface to detect the verb in the future research without any input from the user. In addition, 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 time schedule. For example, meeting rooms are not always in conference.

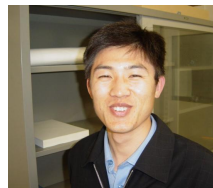
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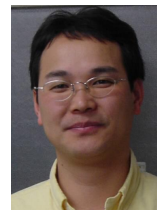
Table 7 Results of questionnaire.

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Chengjiu Yin entered the graduate school of Engineering, Tokushima University, Japan 2003. Currently he is interested in mobile learning and ubiquitous computing.



Hiroaki Ogata received the B.E., M.E. and Ph. D degrees from the Department of Information Science and Intelligent Systems, Tokushima University, Japan, in 1992, 1994 and 1998, respectively. Currently he is an associate professor in the Faculty of Engineering, Tokushima University. He was a visiting researcher of Center of Lifelong Learning and Design, the University of Colorado at Boulder, USA from 2001 through 2003. His current interests are in Computer Supported Collaborative Learning. He is a member of IPSJ, JSiSE, IEEE, ACM, and AIED. He received the best paper award from JSiSE in 1998 and from WebNet in 1999.



Yoneo Yano received B.E., M.E., and Ph. D degrees in communication engineering from Osaka University, Japan, in 1969, 1971, and 1974, respectively. Since 1974 he has worked as a research associate at the Dept. of Information Science and Intelligent Systems, Tokushima University, Japan. He is currently a full professor at the Faculty of Engineering, also a dean of the same Faculty. He was a visiting Research Associate at the Computer-Based Education Research Lab, University of Illinois, USA.

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

His current interests are in the intelligent CAI, human interfaces and groupware. He is a member of the IPSJ, IEICE, and JSiSE, JAPAN Society for Educational Technology, AACE and IEEE. Currently, he is the vice president and the editor in chief of JSiSE and an editor of IEICE.

Appendix 1. The roles at the experimentation.

(Case 1)大学で(in the University) :

Your role: 学生(student.)

Partner's role: 先生(teacher)
先輩(elder student)
同級生(classmate)
後輩(younger student)

(Case 2)アルバイト先で(at the part-time job) :

Your role: 店員(clerk.)

Partner's role: お客さま(guest)

(Case 3)家庭の中で(in your family) :

Your role: 息子または娘(son or daughter.)

Partner's role: 父親(father)
弟または妹(younger bother or sister)

Appendix 2. The questions at the experimentation.

以下の文章の下線部を変化させて適切な表現を話して下さい。(Please speak the appropriate sentence by changing the underlined parts.)

(Case 1) 大学で(at the University):

1. Aさんは明日のミーティング(meeting)に参加しますか(attend) ?
2. Aさんは帰りましたか(go home) ?
3. Aさんはミーティングに来ましたか(come) ?
4. Aさんはケーキ(cake)を食べましたか(eat) ?
5. Aさんは大学長(president)に会いましたか(meet) ?

(Case 2)アルバイト先で(at the part-time job):

1. その服を取ってくれますか(pass) ?
2. Aさんはどの色の服(close)が好きですか(like) ?
3. Aさんはあの本を読みましたか(read) ?
4. Aさんはここに名前を書きましたか(write) ?
5. Aさんは何を食べますか ?

(Case 3) 家庭の中で(in your family):

1. Aさんは夏休みにどこに行きますか(go) ?
2. Aさんは水泳(swimming)をしますか ?
3. Aさんは家に帰りましたか ?
4. Aさんはお昼ごはん(lunch)何を食べましたか ?
5. Aさんは大学長を知っていますか(know) ?