

Learning Written Japanese with Interactive Multimedia Assistance

David Inman

School of Computing, Information Systems & Mathematics, South Bank University, London, UK

The Japanese Education Ministry has funded a project, described here, to assist non-Japanese in learning to read and write Japanese. The aspects of the project which relate to the use and effectiveness of interactive multimedia are described here.

The hypothesis we have been testing is that computer assistance can significantly enhance the ability to learn complex scripts such as Japanese. Even for native Japanese to learn the writing system takes about a decade, and non native adult learners report this being a major problem area. To test this hypothesis software has been built that allows students and teachers to interact electronically using proprietary multimedia enhanced email. Whilst such communication takes place, we record quantitative aspects of the interactions. Questionnaires have provided qualitative feedback.

Any language learner needs considerable context in which to situate their learning. Multimedia can provide context, and interactivity allows a more active learning role to be taken. By adding these elements to the immediacy and cost effectiveness of electronic communication, we believe the language learner can derive considerable benefit. The system is described here, together with some results of our trials.

Keywords: Computer-assisted language learning, email, Japanese, multimedia, distance learning.

Introduction

The Japanese Education Ministry (Monbusho) has been supporting projects that aim to improve Japan's international standing. In our project, we have been looking at how communication between Japanese trainee teachers in Japan (at Tohoku University), and students of Japanese in the UK (Stirling University) and Australia

(Melbourne University) can be improved. Descriptions of the project can be found in (Saita et al, 1994).

The Japanese writing system is complex and is a major source of difficulty for learners. A survey of adult students in language schools in Japan, and of teachers of Japanese (Inman et al 1995) for example showed this to be their area of most concern. Even Japanese children spend about 10 years, from 6 to 16 learning the script.

Standard text book approaches (Kano, 1989, Nagara, 1990) lock the learner into their own sequence of lessons and do not encourage exploration or reading for enjoyment. We wanted to introduce these elements, and felt that interactive multimedia would offer significant advantages.

Initial work centred around using weekly email messages sent between Melbourne University & Tohoku University. Both composition using standard text processing tools for Japanese and reading using on-line dictionaries for example are considerably easier with computer assistance.

The existing email centres around news broadcasts, which are stored as QuickTime movies to allow easy viewing by students. These QuickTime movies then generate an email dialogue with tutors in Japan.

Adding multimedia interaction to this basic system offers some difficulties and advantages. Both are described here.

Japanese Writing

This section gives a brief overview of the special nature of written Japanese, for those unfamiliar with the written language.

There are 3 character sets used by native Japanese. About 2-4,000 Kanji characters are used in everyday written Japanese, although the full set exceeds 50,000 characters. Kanji are almost identical to the Chinese characters from which they were derived. A sample of Kanji is shown in Fig 1.

東京

Fig. 1. A sample of Kanji: Tokyo

Unfortunately for the Japanese, the Chinese character set was not particularly suited to their language. For example Japanese requires inflectional endings which do not occur in Chinese. As a consequence there were no readily available Kanji to express these parts of the Japanese grammar, and so the Japanese created two additional scripts, known collectively as kana, for this purpose. These scripts are phonetic and each describes the 107 distinct Japanese syllables with a 46 character set.

Hiragana are typically used for verb endings, grammatical particles and little known Kanji. 70% of Japanese characters are hiragana. A sample is shown in Fig 2.

あいうえお

Fig. 2. A sample of hiragana

Katakana are used mainly for foreign 'loan' words. About 5% of written Japanese uses this script, but it is growing. A sample is shown in Fig 3.

アイウエオ

Fig. 3. A sample of katakana

An example sentence in Fig 4 shows the three scripts being used together. This sentence means Japanese drink coffee.

日本人はコーヒーを飲む。

Fig. 4. Japanese drink coffee

Email Centred Communication

We decided that real communication would be essential to meet the aims of the project. As the teachers and students were in different countries and the budget was limited, email was a natural choice. The main reason for choosing email was that reading Japanese is difficult. The large number of characters used makes reading a particular difficulty. Digital text allows automated hyperlinks to on-line dictionaries and other assistance.

Other reasons included immediacy and the possibility of real communication. We wanted to avoid the artificial communication of standard text readers. Some of the above could be achieved by fax, but email allows the reader to use on-line help such as CALL programs or on-line dictionaries.

Dedicated Email Software

The large character set for Japanese requires 2 byte encoding (see Lunde 1993), and many email systems support 2 byte encoding these days. However, this project requires additional features, which we have not found available in one application, and so we wrote our own software, called the Kanji Emailer.

For this project there were several advantages over third party applications such as Eudora. Statistics can be collected easily on how email is created and used. Other modules can be tightly linked to the email application (e.g. multimedia content, on-line dictionaries, student modelling modules).

The Kanji Emailer also allows control over privacy / access. This project needs to grant researchers and teachers access to email content,

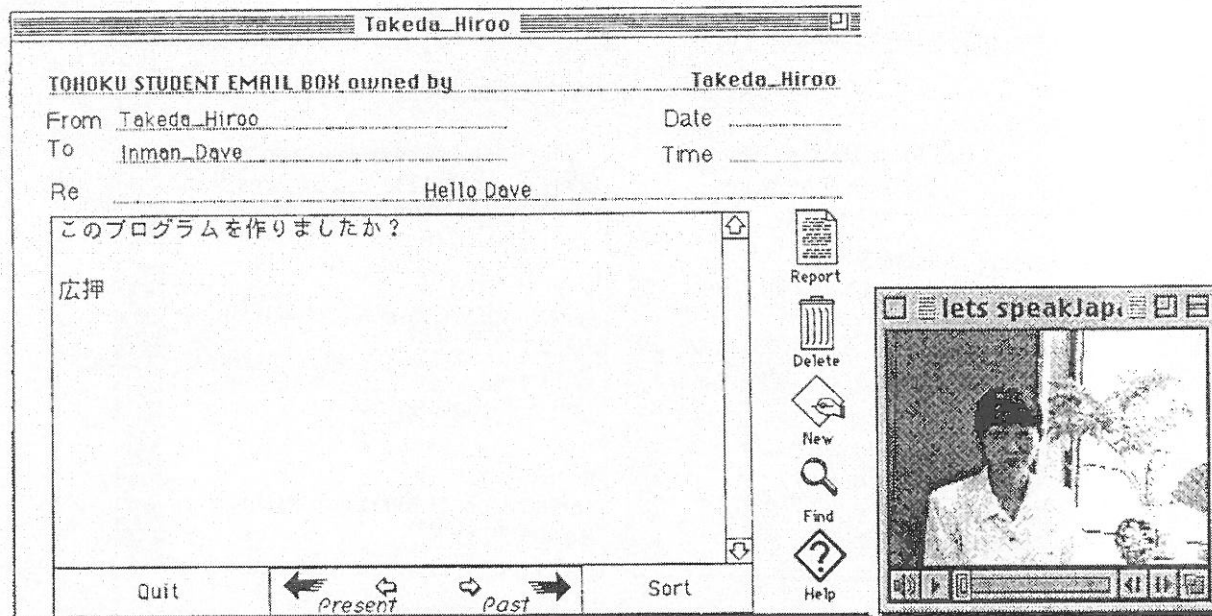


Fig. 5. Student / Teacher interface

with the authors' permission, but to deny it to other students.

The interface can be purpose-built for language learners. For example there is a focus on the basic unit of email as a conversation, between the same people on the same topic. Also we needed a very simple interface as the users are not frequent computer users.

The Kanji Emailer also allows system administrators more control over distribution of user accounts and access, and allows easy transmission of Kanji with any mail server as all content is Binhexed. This is not really a problem today, but still makes no assumptions on the mail servers being used.

The teachers and students both use Macs, so the Kanji Emailer was written in HyperCard with HyperTalk scripts for authoring and control, and C extensions for Binhexing and to provide POP and SMTP functionality. Fig 5. shows the simple interface chosen :

The researchers and administrators control the system using another HyperCard stack. This allows creation of accounts and access privileges, controls all mail sent and received and provides access to statistics on system usage. The interface is shown in Fig 6.

The system records data on use, to allow a variety of statistics to be collected. These include

the changing pattern of use by each student and the changing pattern of use of the email system as measured by the number of messages against time for each user. Differences in use amongst student groups, statistics on "conversations on a topic" and statistics on speed of reply are also measured.

Multimedia Enhancements

In order to add context, and make the communication more direct we wanted to add at least audio, and preferably video, to the basic email communication.

CU SeeMe video conferencing was tried, as a means of supplementing and providing feedback from written material. However, our experience was that there were problems of poor access, and break up of both the audio and video channels. The worst of these problems was the break up of the audio channel, as it seems vital for a learner to have best quality audio. Even small gaps, which can be "filled in" by a native speaker, are a serious problem for a learner.

For these reasons CU SeeMe has been abandoned. It may become an option in the future, if bandwidth on the internet improves. We decided to try and enhance the purpose-built

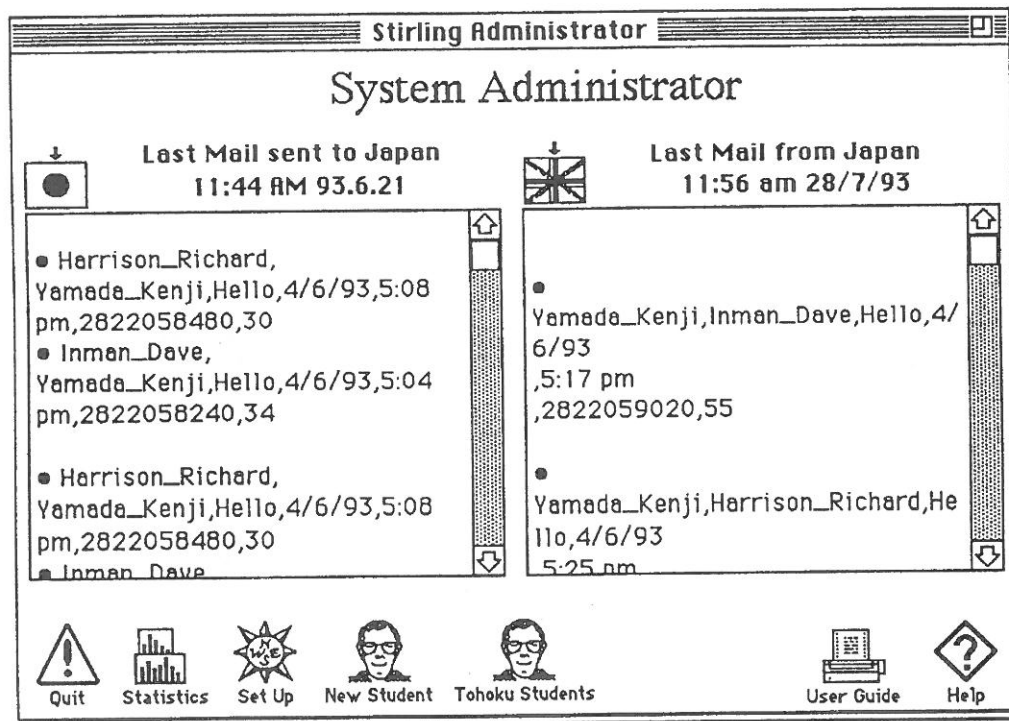


Fig. 6. Administrators interface

software that we had developed for sending Japanese email, to allow video to be embedded.

Movies are big files, typically 1 - 20 Megabytes / minute, depending on size, colour and compression. Sending such big files by email regularly can cause some servers problems.

The mail server usually takes responsibility for splitting big files into packets, sending and re-assembling them with tags to indicate address and part number, for example. We chose to move this responsibility back to the client PC, so that we could overcome some of the constraints imposed by the mail servers we were using.

We chose to split up the movies on the client machine using C code added to the Kanji Emailer. Each movie is split into chunks, typically 30K, and each chunk when sent has a tag added to the subject field. This tag identifies the movie being sent, and the part number of the chunk. This allows the original message to be assembled from its parts, and also to resend any parts if there is a problem with email.

Before playing a movie, all parts are assembled. A check is made to see if assembly has been carried out successfully, and if so XCMDS written in C by Apple Computer are used to play back

the QuickTime movie with standard controls. The movie appears next to the email message it belongs to.

The main use of QuickTime movies is for enhancing content for comprehension, such as news stories. The printed version and QuickTime movie version can be seen simultaneously, adding a richer context and helping with the reading of characters. Typically a news item as a QuickTime movie would be used by a teacher to act as a comprehension exercise, with questions contained in the email message itself. At present, use of QuickTime movies by students, to enhance their submissions to teachers, has not been carried out extensively, due to the time required. Only those students with an affinity for computing have taken this up.

Results & Pedagogic Issues

The main problem in carrying out a statistically valid comparison of the effectiveness of the system developed, was the small size of the groups of students. This meant that control groups could not be formed, as each group would be too small for statistically valid comparison. Also,

students would have felt deprived if excluded from the system. Qualitative comparisons are given below, based on teacher experience and questionnaire feedback. These results, together with some quantitative results, are shown in more detail in (Harrison et al. 1997).

The learners found the writing tasks rather onerous, but they found the email communication more stimulating than writing normal compositions. Their main motivation seemed to lie in communicating with Japanese native speakers of a similar age group, and receiving replies quickly. All participants commented that as the exchange was not one-to-one it was possible to look at a large range of opinions and ideas on each topic and this was stimulating in thinking about the kind of issues presented in the course for discussion. The learners in Australia reported that they felt that their reading speed had improved, despite the fact that reading the email should have been a burden. They did not, however, report that their writing skills had improved. This may be due to their extensive use of word processors, and on-line dictionaries in other parts of their course. They did report that their communication skills had improved and this seems to be supported by the data with changes in the way they developed the themes in the message.

The benefit of using email depended on the Japanese language level of the students. Whilst for advanced students, giving them the opportunity of genuine communication was sufficient motivation, for beginners, who needed more time to think about the language used and to draft several versions of their messages, a more structured approach which did not stress turnaround time seemed of value.

All students preferred one-to-one interaction, but this was not possible given the time available to the trainee teachers in Japan. This required a group-based approach in 1997 and the use of questionnaires as a focus for this group-based discussion seemed to work well.

There was a strongly expressed belief that the email communication should not be assessed. It was felt that this would stifle their ability to communicate, which was seen as one of the main benefits of using email. This was felt to be one of the main motivators, rather than any improvement in their efficiency of learning

Japanese. There was also felt to be a career benefit in becoming proficient in using email.

Limited bandwidth was one of the main problems encountered. Using email with multimedia enhancements requires a lot of bandwidth. For real time interaction between students and teachers satellite links may be one way to resolve this difficulty.

Conclusions

This study showed benefits in using email to assist Japanese language learners, but the type of email communication should depend on the language skills of the student. Advanced students liked the immediacy and possibility of genuine communication, whereas beginners preferred a more structured approach that gave them time to assimilate new language and review their replies.

Email provided a strong motivation for most students, as communication with native Japanese teachers was especially valuable where such a resource is scarce. A preference for one-to-one communication could not be satisfied in the latest study, because of the ratio of teachers to students, but some group-based activities centred around questionnaires worked well. Proficiency in use of email was seen as a benefit to their future career by most students. These results support work by others, such as Warschauer (1996).

In summary, this project has shown benefits in using multimedia-enhanced email to assist language learners. This is especially true where the script used is complex, and where the students and teachers are in different locations. Whilst electronic communication can never be a substitute for a teacher, it provides a valuable channel, especially for the written form and where other on-line resources can be tightly linked to the authoring and viewing software.

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Contact address:

David Inman School of Computing
 Information Systems & Mathematics
 South Bank University
 London SE1 0AA
 United Kingdom
 e-mail: dave@sbu.ac.uk
 phone: +44 171 815 7446
 fax: +44 171 815 7499

DAVID INMAN is a senior lecturer at South Bank University. He teaches knowledge-based systems and multimedia. Current research interests are in natural language processing, computer-assisted language learning and intelligent agents.
