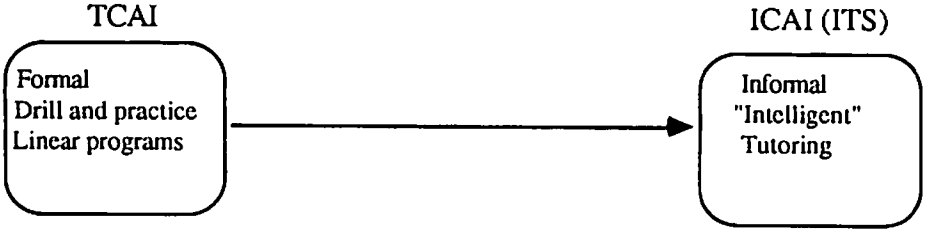
The State of CAI (Computer-Assisted Instruction) Material Development Overseas

Richard Harrison
Scottish Centre for Japanese Studies
University of Stirling, UK.

This paper presents an overview of the development of CAI (computer-assisted insruction) materials for Japanese language teaching that are taking place outside Japan, particularly the type of materials that are currently available or under development and the problems regarding the availability of information and the evaluation of these systems.

The Paradigm : TCAI, ICAI, TCALL, ICALL, ITS

When talking about CAI it first is necessary to define the paradigm in which developmental work is being carried out. With the technological changes that took place in computing during the late 1980s, in which smaller but more powerful machines became available to teachers and researchers, the type of computer-based learning systems being developed also changed, in terms of technological and pedagogic capabilities. The current trend in computer-aided instruction research and development is to move away from what is now called *traditional CAI* (TCAI),[1], which is characterized by linear learning paths using drill and practice exercises, to more flexible "intelligent" systems that fit the paradigm of *intelligent CAI* (ICAI is also referred to as intelligent tutoring systems or ITS).



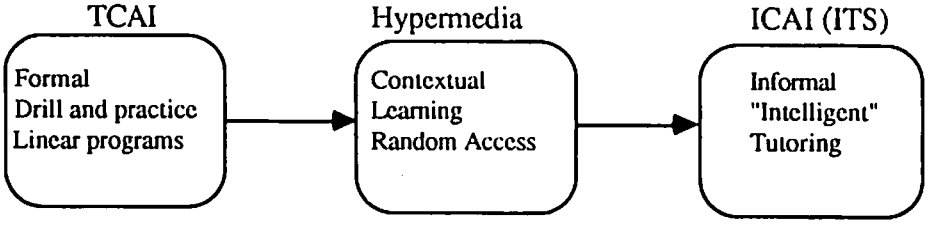
In Japan, the tendency is to use the term CAI to encompass all types of computer-based learning, including language learning, whereas in other countries computer-

[1] S. Otsuki, "Chiteki CAI no paradaimu to jitsugenkankyo", *Joho Shori* 29(1988):1255-56

aided language learning (CALL) has now become a distinct field of study within CAI. It is moving along the same theoretical path of development as CAI is (i.e., from TCALL to ICALL), so that now we are beginning to see the development of intelligent tutoring systems for language.

A more recent development in this area is the emergence of so-called hypermedia systems. These systems, though not "intelligent", do offer a new way of learning by providing the capabilities to use text, sound, graphics, animation, and video on a computer. The student is able to access this information at random (rather than in a linear fashion, as with TCAI) and so "browse" through the information, learning in a much more informal way. For language teaching, this is of particular interest, as it offers the capabilities for creating more "contextual" materials using photographs, animation, and video. Hypercard on the Apple Macintosh is the archetypal hypermedia system, with many more now beginning to appear.

In many ways this new area of multimedia is an intermediate level of CAI, providing systems that avoid the problems of both TCAI (linear learning) and ICAI (expensive developmental systems) by offering affordable yet interesting systems that can be run on desktop and laptop computers.



Now that we have defined the paradigm in which CAI materials are being developed, let us turn to what kind of materials are available for Japanese and what developments we might expect in the future.

Survey of CALL Developments for Japanese

For the past two years the Scottish Centre for Japanese Studies has been collecting information on Japanese CALL software, which has been made into a database with the aim of producing periodic publications to be made available to other educational institutions. The database covers developments in all regions of the world and gives a brief description of each package. The following is a listing of the database to date (excluding Japan):

Location and Author	Name of Package and Description	Hardware
United Kingdom		
New Media Ewan McGregor	Japanese New Media Disc (conversation, signs)	CD-I
Global Learning Global Learning Systems	Japan World CD-I Interactive Japanese	CD-I
University of Stirling R. Harrison	KanaIntro 1.0 (*kana* tutorials) Katakana Maps 1.0 (exercises using *katakana* place names)	Mac Mac
Europe		
Germany W. Hadamitsky	MacSunrise a (*kana* and *kanji* Tutorials)	Mac
France G. Fafiotte	AAOCC b (*kanji* tutorials)	Mac
Finland J. Vaario	Kanji-Sensei (*kanji* learning)	Symbolics
North America		
University of Hawaii n/a	Kanji City (*kanji* learning)	Mac
Los Angeles Conrad Haller	Japanese 1 a (*kana* tutorials)	IBM/Amiga
Illinois Language Learning Lab	Verb Conjugation V1.0 a (verb conjugation)	IBM
Appleton,WI KiCompWare	Moke a (*kanji* flashcards)	IBM
Burlingame, CA Pacific Rim Connections	Eastword a (*kana* tutorials)	IBM

Potomac, MD C. Van Degrift	Kanji-Flash a (*kanji* flashcards)	IBM
JAIMS, Honolulu Larry Cross	Verb Explorer J a (verb and adjective conjugations)	IBM
Santa Barbara, CA Intellimation	Understanding Spoken Japanese a (interactive video)	IBM
Victoria, BC J. Walraven	Kintaro Sensei a (*kana and kanji* tutorials)	IBM
Berkeley, CA Anonae	Kanji, Hiragana, Katakana Exercises a (*kana* and *kanji* flashcards)	Mac
Cambridge, MA L. Clapp	HyperKanji a (*kanji* dictionary	Mac
Knoxville, TN Hyperglot Software	KanjiMaster a *kanji* flashcards)	Mac
Knoxville, TN Hyperglot Software	Easy Kana a (*kana* flashcards)	Mac
University of Toronto K. Nakajima	KanjiCard a (*kanji* tutorials)	Mac
Grand Junction, CO Butler Consulting	Japanese for Everyone a (spoken Japanese)	Mac
Santa Barbara, CA Intellimation	Understanding Written Japanese a (technical Japanese)	Mac
Purdue University T. Maciejewski	Nihongo Tutorial System a (ITS for technical Japanese)	Mac
Purdue University K. Hatasa	Development Tools for Japanese (authoring system for *kana* tutorials)	Mac
Marquette, MI Traveler's Guild	Traveler's Guild (travel phrases)	IBM
Los Angeles, CA K.Hirata	Saijiki c (intermediate/advanced reading)	Mac
Los Angeles, CA K.Hirata	Kyooto, Nara : Hyper Travel c (travel guide using *kana/kanji*)	Mac

Burlingame, CA Eastword Software	Japanese in a Breeze c (*kana* tutorials)	IBM
Santa Monica, CA Voyager Co.	Exotic Japan c (interactive introduction to language and culture)	Mac/IBM
Berkeley, CA Anonae Software	Kanji Exercises c (*kanji* exercises)	Mac

Australia and New Zealand

Footscray Institute of Technology N. Shaw	n/a (conversational Japanese)	IBM
Sydney University H. Clarke	Lexiphon (*kanji* learning programs)	n/a
Jeijing Co. Pty. Ltd. (Queensland) B. Anderson	n/a (*kana/kanji* input system)	IBM
The Western Australian Distance Education Consortium M. Grant	n/a (interactive video for business Japanese)	Interactive Video
University of New England, Northern Rivers and NSW Department of School Education Z. Klich	n/a (four semester graduate Japanese course)	Mac
Auckland NZ H. Eastwick-Field	Ganbare-kun a (*kanji* exercise)	IBM

Other

University of Singapore University of Singapore	n/a (*kanji*, grammar, vocab exercises)	IBM

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a Mangajin, no.8 (1991) (Atlanta).

b G.Fafiotte and T.Cheou, "Learning the Chinese Characters on the Macintosh," in Proceedings of the Seventh Annual Apple European University Consortium Conference, Paris, 1991, pp. 26-29.

c Catalog 25 (Boston: Cheng and Tsui CO., 1992).

Classification and Availability of Information

According to this list almost all the software has been designed for use on either MS-DOS or Apple Macintosh operating systems. In particular, "hypermedia" packages designed using Hypercard are becoming very common.

As yet, however, there are few systems that incorporate ICALL methods and techniques, aside from Purdue University's Nihongo Tutorial System, which is described as an "Intelligent Tutoring System... developing reading competence in technical Japanese" and the Ganbare-kun package, which features "skill-level tracking".

Several of the programs listed appear at first to be covering identical tasks, that is, the introduction of *kana*, *kanji* tutorials, and reading. Although it is useful to have a variety of different approaches, there also is much duplication among the programs, probably because of the lack of information and communication about what developments, on a wider scale, are taking place in the field of Japanese CALL.

My main sources for this survey of Japanese CALL software were non-academic publications, such as the Mangajin survey, the Cheng and Tsui catalogue, and electronic networks and journals. Luckily, at our center we have a very good information officer who regularly scans journals and other publications for new information. However, this is probably not the case for teachers of Japanese, who would like more information on CALL software, either because their center already has machines or because they would like to introduce computer equipment. We often receive requests for information on what kinds of packages are available and which ones we would recommend. But because most of our information is based on what we have on paper, and not on experience, we usually can do no more than advise people to contact the developers directly. Also, with the situation changing all the time, some kind of central "agency" would be helpful, where information about packages that have been made or are being developed, could be registered. Even better would be the ability to obtain demonstrations of the packages to try out before buying them. One means of setting up such an information base would be computer networks and bulletin boards, such as the JTIT-L and Nihongo bulletin boards in the United States. These are accessible from both Japan and the United Kingdom through academic networks, so that a bulletin board for Japanese CALL packages could be set up from which centers of Japanese studies could acquire the latest information for dissemination to other institutions in the host country.

Evaluation of CALL Materials for Japanese

In general, Japanese CALL packages are usually briefly described either by someone who is interested in selling the software or by someone who has not actually used the system for any length of time in an institution that is teaching Japanese. In addition, such packages are often classified and described in terms of what hardware they run on or what aspect of the Japanese language they are designed to teach (e.g, *kana*, *kanji*, reading). What we really need is at least a one-page (or longer) summary of how the package is used, for what kinds of students it might be suitable, its good and weak points, and the like. In short, we need the kind of rigorous review that is applied to any academic publication, because like a book, teachers should be able to recommend a package to their students with confidence. As a guide to what kind of evaluation might be employed for this task, we can turn to work already done in this area for CALL in other domains. Hamburger[2] provides the following suggestion:

> Evaluation of CALL systems depends on the answer to a series of questions: What are our goals and priorities for language learning, and within them what is demanded of CALL? What other kind of entities - video-tapes, human tutors, other software - do we implicitly or explicitly set up as standards of comparison for CALL? To what extent do we want the CALL system to fit with existing approaches and theories? Shall we evaluate a CALL system as a monolith or by module?

Hamburger goes on to discuss whether CALL systems should be evaluated as completed systems or in the design stage, whether they should use the same standards of comparison as for traditional textbooks, and whether CALL programs should be evaluated using computer software evaluation methods:

> How to evaluate a CALL system depends on what we believe to be the established facts and viable theories of the subjects we think are relevant to learning language. Some kinds of evaluation can be based on theory rather than on an implemented system ... though one is not so much concerned with efficiency as with devising a system with a sound basis in linguistic theory, second language acquisition, and linguistically oriented pedagogical principles.

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[2] H. Hamburger, "Evaluation of L2 Systems: Learners and Theory," *Computer Assisted Language Learning: An International Journal* (Oxford: Intellect Ltd., 1990), vol.1, pp. 11~18.

Yazdani offers two sets of more concrete questions that researchers, developers, and teachers might ask when judging a "tutoring" system:[3]

> Questions regarding the architecture of a Tutoring System
>
> Does the software know the subject it is proposing to teach?
> Has the software an open architecture?
> Can it be extended by the teacher?
> Is the software capable of user modelling?
> Can the software be used for individualised instruction?
> Can the software learn new knowledge by interacting with the student?
>
> Questions regarding the environment of a Tutoring System
>
> Does it allow students to explore alternatives, or does it force her/him to follow a pre-set route?
> How much time is the user expected to spend with the computer?
> How much 'off-computer activity is generated by the system?
> How does it encourage off-computing activity?
> Does it encourage joint project work (2/3 users using the system together)?

Although these are very general questions concerning the development of intelligent tutoring systems, they are the start of a perhaps longer list of questions that a panel of referees could use when evaluating Japanese CALL software. It will almost certainly be necessary to devise a subset of questions for looking at the particular features of systems that are designed to teach Japanese. Such a panel would of course need expertise in a variety of fields, such as Japanese language teaching, curriculum design, and CALL research and development.

Programs for teaching Japanese are developing rapidly in both number and technical complexity. Nonetheless, at the same time there are several problems yet to be resolved in the way that Japanese CALL is evolving.

The need for more dissemination of "quality" information about CALL packages so that potential users will know what to expect from them, and to ensure they are used

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[3] M. Yazdani M., "Language Tutoring with Prolog," in Keith Cameron, ed., *Computer Assisted Language Learning: Program Structure and Principles*(Oxford: Intellect Ltd., 1989), pp. 101~110.

correctly and for the purpose intended. This function could be performed by electronic means such as computer networks and bulletin boards, as well as periodical publications and reviews.

The need for a central evaluating body or committee consisting of "expert" referees who can apply rigorous standards to these packages, in the same way that other academic publications in the traditional media are judged.

The establishment of guidelines and standards specifically designed to evaluate Japanese CALL programs, using both standards that can be applied to CALL programs in general and standards that are designed specifically for Japanese CALL programs.

We are still in the very early stage of developing Japanese CALL software, but the pace is gathering speed all the time. I believe that we are now at the point at which the amount and quality of information regarding these software packages should be administered in a sensible and clear way. Such information will allow teachers of Japanese to assess the possibilities for using CALL in their courses. At the same time, this information should be reliable so that teachers can feel confident that the package has first been judged by experts in both Japanese language teaching and CALL development, who can assess programs in the same way an editorial board reviews academic publications.

This is an exciting time for Japanese CALL development, as can be seen from the size of the (growing) list of programs. It is hoped that based on other domains, a framework for establishing high academic standards for developing Japanese CALL can be established in the near future.