

[Review]

**A Comparative Review of Multimedia Tutorial/Test  
Authorware: SuperMacLang, Question Mark, Libra, and Digital  
Chisel**

Toshinori Sasaki (sasakiy@hello.to)  
The University of New South Wales, Australia

## **Introduction**

Despite the recent explosive development of interactive multimedia technologies, many language teachers still find it difficult to incorporate and integrate them into their curriculum, most notably because of the lack of appropriate courseware. Many ready-made materials are not optimized to achieve each institution's particular instructional goals, and developing in-house material is timewise, if not financially and technologically, prohibitive for average language teachers. Even HyperCard is too cumbersome a tool for most language teachers if they intend to develop publishable-quality courseware.

One of the detrimental outcomes of this missing link is that many language teachers, without believing that printed materials provide the most effective medium for getting their ideas across to their students, nevertheless resort to paper-and-pencil-type exercise books. Whereas printed materials have their merit of portability, their inability to provide immediate interactive feedback to each learner's response is often frustrating to the learner.

At many North American institutions, graduate teaching assistants spend many hours every week to mark/correct students' handwritten answers to exercise sheets: Often the nature of marking/correction is simple pattern matching, which an inexpensive computer can substitute. Even teachers' such dedicated efforts cannot bring about an immediate feedback turnaround. In a less labour-intensive setting, model answers of exercises may simply be posted on a bulletin board, which may or may not be informative enough for learners to digest. Certainly, it is too optimistic to expect that computers can provide all sorts of feedback which learners may want to receive, but technology can nevertheless make a significant difference in some important areas of language learning if it is cleverly implemented.

Moreover, teachers, without the burden of mechanical marking and record-keeping, can otherwise spend more time on humanly interactive activities with students, such as oral interviews and consultations on essay writing. These are the crucial areas where only human teachers can provide optimal feedback to learners within the currently available technology.

Fortunately, several user-friendly authoring tools have been released for developing tutorial-type multimedia instructional materials on the Macintosh platform, namely, SuperMacLang (SML), Question Mark (QM), Libra, and Digital Chisel. Each of these originated with different scopes and purposes in mind: SuperMacLang started as an electronic workbook authoring tool; Question Mark originated as an on-line test template;

Libra was primarily an interactive videodisc system authoring tool, and Digital Chisel has been designed from the ground up as object-oriented instructional multimedia authorware.

This review intends to overview the strengths and limitations of these four products so that potential users can select the product which best meets their instructional needs. Products are priced differently from region to region. Cited prices are ones in the US unless otherwise stated.

## Common Features

Despite their different origins, these development tools' features have come to overlap considerably. All these help a teacher without much expertise in computer technology to develop on-line exercises. They all provide a "Page" (or a "Card") metaphor presentation. Various page templates are built-in. Some of those templates are expository (presentation-only), whereas others provide interactive quizzes (multiple-choice, etc.). Each type of exercise occupies one on-line page (it is not possible to mix two or more exercise types in one page). Those types of pages can be sequenced in any order within a courseware file.

Each exercise file consists of a series of card-like online pages that are more or less reminiscent of the HyperCard interface, and each page presents various types of activities/instructions, etc. Important terms representing those elements of each product are summarized in Table 1.

An editor program provides an online list view of all pages in an exercise file. A simple courseware file can be created by setting exercise parameters, choosing a page type, typing text (instructions/questions/answers/feedback), and specifying and locating a pertinent media (or a pertinent portion thereof) to make it launchable. The process is only marginally more complex than word processing.

Table 1.  
*Terms representing elements in SuperMacLang, Question Mark, Libra, and Digital Chisel.*

	SuperMacLang (SML)	Question Mark (QM)	Libra	Digital Chisel
Courseware file	Exercise	Question File/ Test	Lesson stack	Project
Online page	Item	Question	Card	Screen
Learner response record file	Submit file	Answer File	(Not supported)	Database

## Skills Focused Upon

SuperMacLang, Question Mark, Libra, and Digital Chisel are all amenable to writing and/or comprehension (reading/listening) skill training. They are handy tools for

contextualizing discrete pieces of knowledge (e.g., lexicon or structural patterns). It is also possible to present segments of more integrative activities: For example, after watching a QuickTime movie of a three-minute oral interview, a learner can answer questions that tap the interview content from various points of view. Furthermore, it is also possible to use them to develop nonverbal cue interpretation training courseware (e.g., gestures).

Whereas the comprehension activities developed with these tools potentially provide a fairly realistic simulation of segments of real-life communication, expressive (writing) activities presented by these cannot be as authentic (as a matter of fact, *Libra* does not support an interactive type-in exercise). Within the currently available technology, there is no way of automatically providing communicatively meaningful feedback to a wide range of human writing/speaking in a literal sense (c.f., Nagata, 1996). “Writing” activities on *SuperMacLang*, *Question Mark* and *Digital Chisel* are most effectively used for “consciousness-raising” (Rutherford, 1987) of certain structural features and/or lexical practices. This process is an important step in adult foreign-language learning, which should be considered a preparation/rehearsal rather than a substitute for subsequent real-life communication.

Real writing communication can be more effectively achieved via a wordprocessor, Internet e-mail, and of course, hand-writing, each implemented within an appropriate project context. In this connection, it is possible to use one of the currently reviewed four tools to solicit learners' written responses to which a teacher can provide feedback subsequently (batch mode), even though such uses would not have been a major concern of the software developers initially. (Some features of *Libra* are amenable to such batch mode uses.)

## **Availability Information**

### **Availability of SuperMacLang**

The principal author is Judith Frommer (Harvard University), and project management is contributed by Otmar Foelsch (Dartmouth College). The contact address is:

- Dr. Judith Frommer
- Department of Romance Languages and Literatures
- Boylston 206, Harvard University, Cambridge, MA 02138 USA

The copyright belongs to:

- President and Fellows of Harvard College and Trustees of Dartmouth College.

### **Availability of Question Mark**

The product was written by Guy Jackson. The copyright belongs to:

- Question Mark Computing, 5th Floor, Hill House, Highgate Hill, London N19 5NA, England

- Phone: 44-171-263-7575 Fax: 44-171-263-7555  
E-mail: [info@qmark.co.uk](mailto:info@qmark.co.uk)
- Homepage: <http://www.qmark.com/>

A review of an earlier, non-multimedia and non-multilingual version is available at:

- Brazaitis, Krisina & Knowles, Sally. (1997) Software review: Question Mark for Macintosh (Version 1.01). On-CALLs, 8 (1),
- Available at: [http://www.cltr.uq.edu.au/onc\\_all/braz81.htm](http://www.cltr.uq.edu.au/onc_all/braz81.htm)

### **Availability of Libra**

The product was developed by Michael Farris. His contact address is:

- Director, Division of Media Services, Southwest Texas State University. San Marcos, TX 78666-4616. USA
- Phone: 512-245-2319
- FAX: 512-245-3168
- E-mail: [MF03@academia.swt.edu](mailto:MF03@academia.swt.edu)
- AppleLink: SWT.MEDIA
- Homepage: CREATE Web (<http://www.Libra.swt.edu/>)

### **Availability of Digital Chisel**

The product was designed by:

- Peter Rowe, John, Hart, Anthony Mrozinski, Steve Bryan, and Jerry Dawson.
- Rowe and Mrozinski participated in coding.
- The copyright belongs to:
- Pierian Spring Software, 5200 Macadam Avenue, Suite 570, Portland, Oregon 97201 USA
- Phone: (800) 472-8578; (503) 222-2044 Fax. (503) 222-0771
- E-mail: [info@pierian.com](mailto:info@pierian.com)
- Homepage: <http://www.pierian.com/>

Other third-party reviews/reports on Digital Chisel are available at:

- Ryer, Kelly (1997). Digital Chisel 3 to be a Java app. MacWeek 11 (21) May 22, 1997
- Available at: [http://www8.zdnet.com/macweek/mw\\_1121/mm\\_chisel.html](http://www8.zdnet.com/macweek/mw_1121/mm_chisel.html)
- Michael D. Murie (1995) Authoring apps offer scriptless multimedia: Digital Chisel and Special Delivery make interactive presentations easy to create. MacWeek 9 (48) December 11, 1995
- Available at: [http://www.macweek.com/mw\\_12-11-95/rev16.html](http://www.macweek.com/mw_12-11-95/rev16.html)
- MacUser / January 1996 Review Digital Chisel 2.0 and HyperStudio 3.0: Educational-authoring tools go to the head of the class.
- Available at: [http://www.zdnet.com/macuser/mu\\_0196/reviews/review04.html](http://www.zdnet.com/macuser/mu_0196/reviews/review04.html)

## **Product reviews**

### **Review of SuperMacLang (SML)**

#### **Specification**

Reviewed Version:

- SML Author (editor) beta version 1.0d16 (June 13, 1994);
- SML Student (browser) beta version 1.0d16 (June 13, 1994)

Summary of Package:

- The package consists of two major programs, namely, SML Author (authorware) and SML Student (learner's browser).

Documentation:

- A manual file of 37-page length (Microsoft Word for Macintosh format) accompanies the program. No on-line help is available.

Price:

- The beta-site software license was made available at the cost of US\$25 (\$30 for overseas institutions). The price of the final version is to be announced.

Equipment Requirement:

- A sound-capable and QuickTime-ready Macintosh with a hard disk drive is required to run it normally.

Cross-Platform Support:

- Not available. (Macintosh version only.)

Memory and Disk Space Requirement:

- The SuperMacLang Manual recommends that minimally 4MB disk space should be set aside for it. The program size of the author version on the disk is 213K, and the student version is 136K. Their suggested memory allocations are 1300K and 1024K respectively.

Installation Procedure:

- The programs come on two double-density floppy disks. Two segments on the disks once copied on a hard disk, will be automatically conjoined upon double-clicking one.

## Features

### Background of SuperMacLang Development:

SuperMacLang is a rebirth of MacLang, which was originally developed in 1986. The current beta version has such additional features as multilingual capability and QuickTime support, whereas it lacks videodisc interface which was once supported by MacLang. There is no compatibility between MacLang and SuperMacLang exercise files.

SuperMacLang Manual explicitly claims its philosophical consonance with the Proficiency Approach (Omaggio, 1986). SuperMacLang's response sensitive error feedback and contextualization on the strength of multimedia technologies distinguish it crucially from audio-lingual electronic workbooks, according to the manual.

### Authoring Environment:

- The SML Author can open only one page from one file at a time. It presents a list view of all pages within an exercise contextualizing discrete pieces of knowledge (e.g., lexicon or structural patterns). It is also possible to present segments of more integrative activities: For example, after watching a QuickTime movie of a three-minute oral interview, a learner can answer questions that tap the interview content from various points of view. Furthermore, it is also possible to use them to develop nonverbal cue interpretation training courseware (e.g., gestures).

Table 2.

*Page types of SuperMacLang*

	Activity	Answer slot number per page	Possible number of correct answers	Maximal length of a type-in answer	Hint /Feedback
Instruction (1st page)	Reading (No interaction)	-	-	-	-
Fill-in	Type words, phrases, etc.	Unlimited	Unlimited	Unlimited	Response sensitive
Jumbles	Recorder words, phrases, etc. into a correct sequence	Single set	Singular sequenc	-	Response sensitive
Column Matching	Rearrange a matrix of words/phrases along each column	Unlimited number of rows and columns	Singular set of combination	-	Response sensitive

Multiple Choice	Choose one or more correct answers among alternatives	Unlimited choices	Singular set	-	Response sensitive
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The answer phrase/sentence in a Fill-in exercise can be as long as several lines.

SuperMacLang stands out among competitors by its flexible response-sensitive feedback capability. In a Multiple-Choice activity, a feedback message can be specified for each choice. In a Fill-in activity, an author can specify a feedback message to each anticipated response. In Jumbles and Column-Matching activities, correctly answered portions sequences/matchings are confirmed upon a learner's request ("Check"), so that s/he can focus on the remaining questions.

In all these cases, the feedback messages are strictly textual (for example, it is not possible to present a segment of a QuickTime movie, which is particularly relevant to the questions a learner failed to answer correctly.)

One exercise page of SuperMacLang can contain one multimedia event: either a QuickTime movie or a sound resource. In either case, only one fixed-length segment of audio/visual presentation is accessible in one exercise item (page). It is not possible to present multiple levels of visual/auditory information in one page.

Multimedia event presentation is user-controlled upon mouse click: There is no way for an author to restrict the number of replays. Hypertext and text annotation are not supported.

In the learner environment, the three modes in Table 3 are available:

Table 3.  
*SuperMacLang's learner environment modes*

Mode	<p>Feature</p> <p>When exercise parameters are set in a certain way, a learner can answer questions in an arbitrary order. Otherwise, s/he has to answer them sequentially and cannot go back to earlier items. Branching and random selection of items are not currently supported.</p> <p>SuperMacLang supports WorldScript (e.g., Chinese, Japanese, and Arabic character sets).</p> <p>Learning History Record and Data Security:</p> <p>In the current beta version, SML Student generates an Excel file that contains learning history information. (To make this happen, a student has to click on the "submit" button after the session is over.) However, report documents are separately created for each learner trial, and their formats are not uniform (for example, the location of the response data to a certain question item within a file is typically different from one student to another). Therefore, there is no easily apparent way to collate the learning history record from multiple learners into a single file automatically: A substantial amount of manual work, or computer programming, will be required to plug the data into a spreadsheet and/or database program for systematic analyses.</p>
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<p>In the current version, students have full access to his/her learning record file, even in the Homework or Test mode.</p> <p>Networking: SML Students should be installed on each student workstation. An exercise file cannot be shared, but a learner can submit her/his learning history file over a network.</p> <p>Future Developments: The following additional features of SuperMacLang are promised in the Manual:</p>
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- Better learning record data security, such as: "Hand in Exercise' will transmit the student's work via the network directly to the professor." (Manual, p. 35).
- Editors that will allow exercise authors to play any arbitrary portion of sound and movie segments (Manual, p. 29)

### **Review of Question Mark (QM)**

#### **Specification**

##### Reviewed Version:

- Designer (editor) version 2.0.4 (June 3, 1997);
- Presenter (browser) version 2.0.4 (May 26, 1997)

##### Summary of Package:

- The package consists of two major programs, namely, Designer (authorware) and Presenter (learners' browser).

##### Documentation:

- A 102-page manual accompanies a package. Useful on-line help is also available.

##### Price:

- A site license fee of Question Mark version 2 starts from US\$495 (single concurrent author). An additional royalty fee is charged to distribute a Presenter outside of the licensed territory.

##### Equipment Requirement:

- A QuickTime-ready Macintosh with a hard disk drive is necessary to run Question Mark normally.

##### Cross-Platform Support:

- PC and WWW versions of Question Mark are also available, and cross-platform file conversion is possible. Reportedly the PC version is more powerful and flexible than its Macintosh counterpart, which is being reviewed here.



#### Memory and Disk Space Requirement:

- The program size of the author version on the disk is 1002K, and the student version is 387K. Their suggested memory allocations are 2400K and 1200K respectively.

#### Installation Procedure:

- The programs come on two high-density floppy disks, and installation is a straightforward drag-and-drop procedure.

#### Features

##### Background of Question Mark Development:

- Question Mark version 2 (QM2) is a multilingual, multimedia expansion of Question Mark (QM), which was developed in 1988 (MS-DOS version). The first Macintosh version appeared in 1993. This product, as its name suggests, was originally developed as an on-line test template for generic purposes.

No explicit discussion on instructional/learning theories underlying the product is presented in documents accessible to the present reviewer. On the other hand, the influence of test theories is obvious from the product's powerful data analysis module and the branching feature. The latter feature is essential to implement adaptive testing based on the Item Response theory (Lord, 1980). Psychometric considerations rather than psycholinguistic ones have played a central role in designing Question Mark.

##### Authoring Environment:

- The Designer (editor) can open multiple pages from multiple files at a time. Also, it presents an online list view of all pages, though only initial characters in the first line of each page can be viewed from there. Moreover, it generates a scroll view of all instructions, questions, answers, and control parameters within an exercise file, which can be exported as a text file. No macro language or interface with external routines are supported.

##### Learner Environment:

- The courseware developer can choose the page size of each courseware file from three options (9, 19, and 13-inch full-screen sizes). Following an optional Introduction text which optionally asks the learner's name, each page provides one of the eight activity types in Table 4.

Table 4. <i>Page types of Question Mark</i>
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	Activity	Answer slot number per page	Possible number of correct answers	Maximal length of a type-in answer	Hint /Feedback
Introduction text(1st page)	Type name(Read an instruction, etc.)	-	-	-	-
Explanation Screens	No interaction	-	-	-	-
Multiple Choice	Choose one out of alternatives (radio button)	2-6 choices	Singular choice	-	Choice sensitive
Multiple Response	Select 0,1 or more answers (checkbox)	1-12 responses	Singular set	-	Fixed
Ranking /Matching	Matches answers or ranks answers in order (type in a blank)	1-6 objects	Singular set	-	Fixed
Fill-in Blanks	Filling in blanks in the question wording	1-6 blanks	1-6 alternatives	1-20 bytes (when there is one blank in a page)	Fixed
Word Answer	Type a word	Single-slot	1-6	1-20 bytes	Fixed
Numeric	Type a number	Single-slot	Range specification possible	-99999999.999999 ~+99999999.999999 9	Fixed
Free Format	Type a free format answer	Single-slot	Many words (boolean)(formula)	Unlimited	Fixed
Final Screen	No interaction (Read the	-	-	-	-

	total score, etc.)				
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The last page can be an optional, Final Screen which presents such information as the total score. Multiple-Choice and Multiple-Response exercises support the randomization of choice positions every time they are presented on screen.

QM has limited error feedback capability. Response-sensitive error feedback messages can be provided only within the Multiple-Choice exercises. In other exercise types, only one error message is available, regardless of the nature of the error students have made.

One exercise page of Question Mark can accommodate one PICT-format graphic and one QuickTime movie concurrently. QuickTime presentation is learner-controlled upon mouse click: There is no way to restrict the number of a movie replay. Hypertext and text annotation are not supported.

The developer may decide whether or not a learner can retry a question s/he failed to answer correctly, but a limitation cannot be set on the number of possible retries.

Depending on the settings of the parameters, students are or are not allowed to:

- Pass a question item;
- Retry wrong answers;
- Go back and change answers;
- See the right answers after each question or after the whole test.

It is possible to limit the length of time students can spend for the entire test, but not on each page specifically.

Branching within a Question file is possible from a multiple-choice page, depending on the student's choice. Branching from one file at its end to others depending on the total score is also possible.

The randomization of items is supported. When only a certain number of items are randomly chosen from a larger item pool ("random choice"), it is possible to select golden questions, namely, items that never fail to be presented. The positions of those golden questions within the question presentation sequence are each fixed.

Question Mark for Macintosh supports WorldScript, although font types in some fields (e.g., "Hint") are fixed to either Geneva, Monaco, or Chicago.

Curiously, a learner cannot launch Presenter by double-clicking on a question file: S/he has to open the application first and then open a Question file from within it. This is cumbersome, but it gives learners a lesser chance to tamper with the learning history record (answer file) which is generated within the same folder as the question file.

#### Learning History Record and Data Security:

- Question Mark Presenter can create a file that contains learning history information. A built-in module can collate the data from multiple learners into a single file, and a Designer (editor) can further analyze them. It is easy to plug the data into a spreadsheet and/or database program.
- Also, it is possible to give different weights to the questions in calculating the total score.

There are four types of data security measures (Table 5).

Security measure	Function
Password protect from teacher application	To protect a question file from unauthorized use in the main Question Mark application
Password protect from student application	To set a password that must be entered by students to allow them to answer the test
Password protect answer file created	To add a password to any answer file created by this test
Stop Test being asked except from another	To prevent this test from being shown on the list of available tests in the Test Delivery software

Networking:

- Each student workstation should have a Presenter on its hard disk. An exercise (Question) file can be shared, and a learning record file is created on the disk which accommodates the exercise file. In other words, a server disk on which the exercise file resides can collect all learners' data across the network. This data transmission takes place automatically, as soon as a learner leaves an exercise/test file. Sharing a large QuickTime file is also possible, but is not generally recommended.

## **Review of Libra**

### **Specification**

Reviewed Version:

- Libra Author (editor) Version 1.2.9 (July 7, 1997);
  - Libra Player (browser) Version 1.2.7 (July 10, 1995)
- (Development of Version 2 is underway.)

Summary of Package:

- The package consists of two major programs, namely, Libra Author (authorware) and Libra Player (learner's browser).

Documentation:

- A reference manual of 130-page length accompanies the program. "Getting Started with Libra" and "Instructional Basis of Libra" are downloadable from Libra's homepage. No online help module is implemented within the programs.

Price:

- One Libra software package costs US\$50. A multi-user discount is available. Distributing Libra Player is royalty-free for educational use.

Equipment Requirement:

- System 7.1 or later; A Macintosh with at least 8MB RAM devoted to Libra (16MB is needed to run a QuickTime); hard disk.

Cross-Platform Support:

- No PC and WWW versions are currently available.  
(Development of a Windows version is underway.)

Memory and Disk Space Requirement:

- The entire Libra Author (author version) package downloaded from the CREATE homepage occupies 5.2MB on the present reviewer's harddisk (fat binary version). The program size of Libra Author on the disk is 2.7MB, and Libra Player (student version) is 1.7MB. Their suggested memory allocations are 3507K and 2057K respectively.

Installation Procedure:

- The programs come on 3 high-density floppy disks. Installation is straightforward.

## Features

Background of Libra Development:

- Libra was initially released in 1993 at Southwest Texas State University as a HyperCard 2.1-based authoring tool of interactive videodisc courseware, using listening comprehension strategies.
- "Instructional Basis of Libra" cites trends in applied linguistics research (Krashen's monitor model and comprehension approach) to emphasize the importance of comprehension processes in L2 learning, along with a material's authenticity. It also invokes cognitive psychology to claim the importance of schemata in language comprehension.

Authoring Environment:

- Reflecting its origin as HyperCard software, Libra's authoring environment is similar to HyperCard in various respects, including:
  - "Home stack" concept;
  - lockable fields;
  - automatic immediate saving of modifications on a stack;
  - keyboard shortcuts.

Except for a few exceptions (e.g., assigning icons to fields in an icon sorting question), authoring procedures are mostly object-oriented and intuitive.

Libra Author can open only one page from one exercise file at a time. It presents a list view of pages in a file, but not much page content can be viewed from the list. Like HyperCard, Libra can print a stack's screen images.

Libra supports a “handler”, which is a simplified, visually-programmable macro. Though not as powerful as HyperTalk or full-fledged programming languages (e.g., a conditional branching is not supported), it can launch a series of “Libra events” (multimedia, navigation, hypertext, ...), open another Libra stack, and it can even launch a different application.

Furthermore, a Libra stack can be converted into a HyperCard stack. Once it is converted, it can be modified and scripted as an ordinary HyperCard stack. A stack once converted to a HyperCard format can no longer be back-converted to the Libra format.

Learner Environment:

- The developer can choose the page size of each courseware file from 9, 10 and 13 inches. Following the Introduction and Procedural Direction pages, a Libra stack page can present an Expository page (text presentation) or one of four types of interactive exercises (Table 6):

Table 6.  
*Page types of Libra*

	Activity	Answer slot number per page	Possible number of correct answers	Maximal length of a type-in answer	Hint /Feedback
Introduction	Read instruction	-	-	-	-
Procedural Directions	Read directions	-	-	-	-
Expository	Present information(text, graphic, icon buttons, ...)	-	-	N/A	-
Multiple Choice	Choose one from alternatives	4 choices	1	N/A	Response sensitive
Check List	Check correct items	6 items	0-6	N/A	Response sensitive
Binary Checklist	A forced choice between a pair of alternatives	6 pairs	1 each	N/A	Response sensitive
Icon Sorting	Move icons to sort them into proper category fields	Up to 25 categories	1	N/A	Response sensitive

Libra does not support an interactive type-in exercise, which stems from Libra's origin as a listening comprehension exercise template. However, Libra can open a Student Worksheet, in which learners can type in comments, etc. (No mechanism is built into it to mark typed answers).

Feedback messages to a learner's response can be either textual or multimedia-based. In a Multiple Choice exercise, feedback messages can be crafted for each choice. In a Check List and Binary Check List exercises, feedback messages may depend on the global condition (e.g., "If all items checked so far are correct then..."). In an Icon Sorting exercise, icons placed on the wrong place can be highlighted. It can also induce global condition-sensitive messages (e.g., "If all icons placed so far are correct then...").

Libra supports QuickTime, graphics (static), digitized sound, and videodisc (CAV; CLV) interface. Each media segment can be associated with one of Libra buttons, which are by default aligned at the bottom of each card. While an item from the "Lesson stack" is open, a student can optionally open screens from ancillary stacks (e.g., dictionary, videodisc script).

It is possible to present different portions of a movie as a hint (e.g., when a learner fails to correctly interpret a certain videodisc segment presented as a "First hint", s/he will press a "Second hint" button to view a narrower portion which highlights the most pertinent sentence/phrase).

Libra can time-control QuickTime: Namely, it is possible to present a certain portion of a QuickTime movie by specifying "start-time" and "end time" parameters (it is not necessary to create a new QuickTime file each representing a to-be-presented segment).

On the other hand, an author can't control how often a learner can replay a certain media segment.

A hot text can launch various types of events, much like a Libra button. Moreover, Libra provides tools for learner-controlled explorations of the media space. For example, students can keep a memo on a worksheet throughout navigation. S/he can keep her/his video segment library. Libra also provides Video-scripts, an on-line dictionary, and notepads.

Libra does not provide distinctively different modes in the learning environment. By arranging navigation control buttons in a certain way, however, the developer may decide whether or not a learner can retry a question s/he failed to answer correctly, but a limitation cannot be set on the number of possible retries.

An author can arrange various sorts of navigation buttons on the student stack. Their functionalities include:

- return to the previous page;
- go to the next page;
- return to initial page;
- show the list view of all pages;
- jump to a certain page;
- launch another stack.

It is also possible to disable some of these buttons on certain pages.

When navigation buttons are arranged in a certain way, a learner can answer questions in an arbitrary order. In another setting, s/he has to answer them sequentially and cannot go back to earlier items.

While an item from the Lesson stack is open, a student can optionally open screens from ancillary stacks (e.g., dictionary, videodisc script).

Libra supports WorldScript, although some pop-up window fields are unable to properly display WorldScript (e.g., Textual feedback; Page list view; Alert dialogue).

Learning History Record and Data Security:

- The current version does not support the learning record. Accordingly, no data security measure is provided.

Networking:

- Libra Player ought to be installed on a learner's workstation hard disk. Lesson stacks on a server can be shared across the network.

Future Development:

- Version 2 is expected to support:
  - A "historian" (learner record keeping)
  - audio-CD events
  - E-mail and chat functions
  - HTML document export, which provides an interactive Web page.
- (Alpha-testing of Libra Player 2.0a8 is underway.)

## **Review of Digital Chisel**

### **Specification**

Reviewed Version:

- Digital Chisel://HTML (editor) Version 2.1.0. (March 31, 1996);
- Digital Chisel User Player (browser) Version 2.1.0. (March 31, 1996)

The most recent version is 2.1.4.

Summary of Package:

- The package consists of two major programs, namely, Digital Chisel://HTML (authorware) and User Player (learner's browser). It also contains a CD-ROM, The Digital Chisel Multimedia Library.

Documentation:

- A 202-page manual accompanies the program. On-line help is also available.

Price:



- A single copy of home version Digital Chisel costs US\$109 (single-home version). A single school version is US\$149.00 which includes a teacher's guide. Multi-user discounts and site licenses are available. Distributing User Player is royalty-free for non-commercial use.

Equipment Requirement:

- A sound-capable and QuickTime-ready Macintosh with a minimum of 4MB memory, a hard disk drive, and interface with a videodisc and CD-ROM players are required to take full advantage of all its functions. System 7.x or above is recommended.

Cross-Platform Support:

- A Windows/NT version (a java web authoring program) is available.

Memory and Disk Space Requirement:

- The entire Digital Chisel package occupies 12.2MB on the present reviewer's harddisk. The program size of Digital Chisel://HTML (editor) on the disk is 2.2MB, and Digital Chisel Player (browser) is 1.8MB. Their suggested memory allocations are 3602K each.

Installation Procedure:

- The programs come on 6 high-density floppy disks. The installation procedure is slightly non-standard but easy to execute.

## Features

Background of Digital Chisel Development:

- Digital Chisel has been developed as an interactive multimedia presentation and instruction authoring tool. The reviewed version is written with SuperCard.
- No explicit claim is made in its manual regarding the learning/teaching theory Digital Chisel subscribes to.

Authoring Environment:

- The Digital Chisel://HTML (editor) can open one page each from multiple files at a time. Copy/Cut and Paste between files are easy to execute. It provides a HyperCard-like foreground vs. background distinction.

Digital Chisel://HTML also presents an online list view of all pages in an exercise file, but not much of page content can be viewed from the list. Moreover, it generates a scroll view of all instructions, questions, and answers within an exercise file, which can be exported as a text file.

Digital Chisel does not support a full-fledged macro language. However, it is possible to chain “auto-events” so that a series of multimedia and navigation events take place automatically. (No conditional branching is supported.)

Digital Chisel://HTML can export HTML files. The resultant Web page does not provide interactivity beyond simple navigation and static media presentation supported by a Web browser (i.e., it does not generate a CGI script).

Learner Environment:

- The developer can decide the page size in each courseware file deliberately. The first page of a courseware file can be an optional, noninteractive text presentation (“Instruction”). Each subsequent page provides one of the six types of interactive exercises in Table 7:

Table 7.  
*Page types of Digital Chisel*

	Activity	Answer slot number per page	Possible number of answers	Maximal length of a type-in answer	Hint/Feedback
Blank	Reading (No interaction)	-	-	N. A.	-
Presentation	Present an instruction or other text field	-	-	N. A.	-
Multiple Choice	Choose one correct answers among alternatives	6 choices	1	N. A.	True/False notice only
True/False	Decide whether a certain statement is correct or not	1 pair (true vs. false)	1	N. A.	True/False notice only
Matching	Make pairs from choices in two groups	8 pairs	1	N. A.	True/False notice only
Picture Pick	Click on one of the pictures to choose a correct answer	Unlimited	1	N. A.	True/False notice only

Typed Response	Type a word /phrase in a blank field	1 slot		32K	True/False notice only
Essay	Type an essay into designated field <sup>a</sup>	1 field	(Noninteractive)	32K	-

In all these exercises, only one answer is deemed correct. For example, the “Typed Response” does not allow for alternative correct answers, as opposed to SuperMacLang and Question Mark.

The feedback messages are primarily auditory (sound effect). In addition, it is possible to take learners who answer a certain question correctly and incorrectly each to a different page. However, Digital Chisel cannot differentially treat learners who committed different types of errors: Response-sensitive error feedback is not supported.

Digital Chisel supports QuickTime and videodisc interface, as well as audio-CD, graphics (static), path- and frame (PICT) animations. The mechanism of frame animation is similar to a conventional animation movie: it rapidly presents a series of pictures that are slightly different from each other to create an illusion of movement. On the other hand, path animation changes the location of a single picture over the screen.

One page can accommodate many different types of multimedia events. Presentation of multimedia events can be either user-controlled or author-controlled: Namely, it is possible to develop a module that automatically presents a certain piece of the multimedia event once a page is opened, etc.

Digital Chisel also provides its sound record interface and draw & paint tools, together with a Library, namely, a handy clipboard of media segments to facilitate editorial processes.

A hot text can launch various types of events, much like a button. An annotation to a part of a text can be placed within a Post-It-like small field, which pops up upon mouse-clicking the pertinent text part.

Students may or may not be allowed to revisit a question that has already been answered. When the “revisit” option is chosen, the feedback routine is automatically disabled.

When navigation tools are arranged in a certain way, a learner can visit pages, in an arbitrary order. In another setting, s/he has to answer them sequentially and cannot go back to earlier items. Branching is possible depending on a learner's response. Randomization is not supported.

#### Learning History Record and Data Security:

- Digital Chisel can create a file that contains learning history information. A built-in module can collate and further modify the data from multiple learners. It also exports an ASCII text file that can be plugged into a spreadsheet and/or database programs. Each exported file contains the data of one learner only.

When the learning history is recorded, only those who have typed one of the registered learner names can open the file: An access will be denied to other users.

Furthermore, the following two additional types of access restrictions to the project and learner history database are available:

- Author Mode Password
- Play Mode Password.

Digital Chisel supports WorldScript, although some pop-up window fields fail to properly display WorldScript (e.g., Database Project Information, namely, a scroll view of instructions, questions, and answers).

Networking:

- A Digital Chisel Project (exercise file) can be accessed over a network, even though only one user can use it at a time. On the other hand, a Digital Chisel database cannot be shared: The learning history of learners each working on a different workstation will be stored in the database on the respective local disk.

Future Development:

- Version 3 is expected to:
  - be Java-scripted;
  - be platform-independent between Windows95, NT, and Mac;
  - export interactive HTML documents;
  - run on the Internet;
  - provide a more powerful database;
  - support a visual authoring environment;
  - support applets
- (Internal evaluation of version 3 awaits Apple's release of new Java runtime engine, MRJ2.1.)

### Summary of the Product Reviews

Table 8 provides the summary of the features in the reviews.

Table 8. Comparison of Features of SuperMacLang, Question Mark 2, Libra and Digital Chisel				
	SuperMacLang (SML)	Question Mark (QM)	Libra	Digital Chisel
Publisher/Copyright holder	President and Fellows of Harvard College & Trustees of	Question Mark Computing	Southwest Texas State University	Pierian Spring Software

	Dartmouth College			
Examined version	Beta version 1.0d16	Version 2.0.4	Version 1.2.9 (editor); Version 1.2.7 (browser)	Version 2.1.0 (2.1.4 is the latest)
Final version price	To be announced	Site license US\$495-	US\$50 per copy	US\$109 per copy
Hardware requirement	hard disk; Sound-capable and QuickTime-ready Mac	hard disk; QuickTime-ready Mac	hard disk; Sound-capable and QuickTime-ready Mac	hard disk; Sound-capable and QuickTime-ready Mac
Cross-platform support	Mac version only	PC (DOS and Windows) and WWW versions also available	Windows version development is underway.	Windows version is available.
Program sizes	213K (editor); 136K (browser)	1002K (editor); 387K (browser)	2.7MB (editor); 1.7MB (browser)	2.2MB (editor); 1.8MB (browser)
Suggested memory allocations	1024K (editor); 1300K (browser)	2400K (editor); 1200K (browser)	3507K (editor); 2057K (browser)	3602K (editor); 3602K (browser)
Page size	Author's choice	9, 10 and 13-inch screens	9, 10 and 13-inch screens	Author's choice
Editor's simultaneous page/file access	One page from one file	Multiple pages from multiple files	One page from one file at a time	One page each from multiple files
Scroll view of instructions, questions, and answers in the authoring environment	Not supported	Supported (file export possible)	Supported as a "Print stack" command	Supported (file export possible)
Activity types	Fill-in Jumbles Column Matching	Multiple Choice Multiple Response Ranking /Matching Fill-in Blanks Word Answer	Introduction Procedural Directions Expository	Blank Presentation Multiple Choice True/False

	Multiple Choice	Numeric Answer Free Format	Multiple Choice Check List Icon Sorting Worksheet (non-interactive)	Matching Picture Pick Typed Response Essay
Type-in answer length restriction	Flexible	Tight	N/A	Flexible
Multi-level hints in one page	Not possible	Not possible	Possible	Possible
Response-sensitive error feedback	Fully supported	Partially supported (Multiple Choice only.)	Partially supported	Not supported
Presentation media	QuickTime digitized sound (sound resource)	graphics (PICT) QuickTime	QuickTime videodisc (CAV & CLV) digitized sound graphics	QuickTime videodisc CD audio digitized sound synthesized voice graphics path animation frame animation
QuickTime replay time-control	Not supported (promised in a future version)	Not supported	Supported	Not supported
Media presentation control	Learner-control	Learner-control	Learner-control	Learner- or author-control
Hypertext	Not supported	Not supported	Hot-text link	Hot-text link
Ancillary learning aid files	Not supported	Not supported	Video script Dictionary	Not supported
Navigation control options for learners	Sequential move Skipping Returning List view	Sequential move Skipping Returning Random selection Golden question (Branching)	Sequential move Returning List view Conditional disabling	Sequential move Skipping Returning Branching
Test-taking time control	Not supported	1-180 minutes or unlimited	Not supported	Not supported

Data security	To be supported	Supported	N/A Flexible	
Multi-level hints in one page	Not possible	Not possible and powerful flexible(Consolidates multiple learners' records in one file.)	Not supported (will be in V. 2)	Powerful and flexible (One file per learner's trial)
Weighing items in the total score calculation	Not supported	Supported	N/A	Not supported
Macro/External routine interface	Not supported	Not supported	Handler HyperCard converted stack can be modified and scripted. Launch other applications	Event chaining (Applets will be supported in Version 3)
Multilingual (WorldScript)	Yes (a bug in "Jumbles" exercise)	Yes (not in some fields, though)	Yes (some fields do not properly display it)	Yes
Paint & Draw tools	Not supported	Not supported	Supported	Supported
Sound record interface	Not supported	Not supported	Not supported	Supported
Network(file sharing)	learning record submission	exercise sharing (multiple users can use the same file simultaneously) learning record file sharing	exercise sharing	browser sharing exercise sharing (only one user can use it at a time.)
Future development	Better learning record data security; QuickTime and sound time control		Version 2 earner record keeping audio-CD events E-mail and chat export interactive Web page	Version 3 Java-scripted; cross platform; export interactive Web page; run on Internet;

				powerful database; visual authoring environment; applets
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## Product Evaluations

### Evaluation of SuperMacLang

Strengths:

- SuperMacLang, which has evolved out of a stand-alone electronic workbook authorware, can present flexible, response-sensitive feedback messages. This feature is particularly useful, given insights from the current second language acquisition research which emphasizes the interface between controlled (which is typically conscious) and automatic mental processes. Presumably, this tool is self-sufficient as an authoring tool for an individual teacher engaged in small-scale courseware development.

For example, an EFL writing teacher who is annoyed by his students' frequent erroneous uses of prepositions in expressing time (e.g., "I got up in /on 7 o'clock") can use SuperMacLang to craft a series of exercises each simulating students' typical preposition misuses, and subsequently, send error-prone students to a computer lab to study his courseware. Whenever a learner chooses a wrong preposition in a certain context, the courseware does not simply reject the answer but explains why the particular answer s/he has chosen is inappropriate, on the strength of SuperMacLang's response-sensitive error feedback capability. The teacher can develop an increasingly exhaustive suite of response-sensitive feedback messages to possible errors, by incorporating students' errors which are automatically recorded in their learning history record files.

Even though it is too optimistic to expect that this type of direct instructional intervention alone will immediately eradicate errors in all instances, directing a learner's attention to a certain crucial feature will enhance the likelihood of internalizing subsequent linguistic inputs to facilitate the eventual acquisition, as recent SLA research suggests (e.g. Doughty, 1991; VanPatten, 1990). Indeed, "adult learners can and do use feedback to learn specific and abstract linguistic generalizations and to correctly narrow the application of those rules" (Carroll & Swain, 1993: 358).

Limitations:

- On the other hand, SML's editor is not powerful enough for large-scale system development: Since it is not possible to open more than one file at a time, there is no readily apparent way to develop an item bank to recycle questions efficiently.



A sentence completion task using the Jumbles may appear tricky to learners because the system allows for only one correct word sequence. On the other hand, more than one sequence of words is typically possible in many languages when the sentence is more or less complex, as an outcome of scrambling. It is up to the courseware developer to select a sequence and instruction phrases carefully so as not to confuse learners in this regard.

Also, the present reviewer failed to create a proper Jumbles task using Japanese characters: WorldScript Japanese characters once scrambled, became unrecognizable.

Wish list:

- Better data security
- More powerful editor
- Media-rich environment
- Flexible editor
- Macro support
- Stronger data report.

#### **Evaluation of Question Mark**

Strengths:

- Question Mark's origin as an online testing tool is reflected in versatile question types, rich test-condition-control functions, and powerful editing and report capabilities. Among the 4 tools reviewed here, only Question Mark can collect multiple students' learning records across the network, and consolidate them into a single file. The present reviewer is exploiting this feature in his Japanese language class to feed quiz results into a student record database which is developed with FileMaker Pro 3. (Carrying out this data transfer with one of the other authoring tools would be painfully laborious.)

Its elaborated data security and time limitation features make it a useful tool to give online tests to students, which will make a course management process more efficient.

Question Mark's powerful editor, which can open multiple pages from multiple files simultaneously, makes it easy to recycle exercise items in different instances ("item pool"), which is an increasingly common practice under the influence of modern testing theories. This strong editor coupled with its capability to generate a text file enlisting all questions, answers, hints, and conditions is amenable to a large-scale courseware development project. If an extensive exercise library that covers a long-term language course is undertaken, Question Mark should provide an efficient development tool.

Limitations:

- Despite the above-mentioned data security measures, there remains a security hole, because Question Mark's learning history records (answer files) are created in the same folder as the question file. This feature makes it difficult to prevent a determined cracker from tampering with the files over the network.

Also, the multimedia presentation capability of Question Mark is limited to playing one QuickTime movie segment on each page. Moreover, there is no way to restrict the number of media replays (students can replay the movie as often as time allows). This makes it difficult to use Question Mark to provide a lower-level listening skill test, in which the number of media replays is typically fixed.

There are fairly tight restrictions on the length of answer words/phrases in some types of exercises. For example, the answer word can be no more than 20-byte long in Word Answer exercises when there is one blank in a page. This restriction is even tighter when more than one blank is there. This is a rather tight restriction for learners of such syllabary agglutinating languages as Japanese.

Also, Question Mark's "instructional" functions (e.g., hints, error feedback messages) are not as flexible as its "testing" side. Hint messages are strictly textual, and exercises, except for the Multiple Choice, provide only one error feedback message, regardless of the type of error the learner has committed. In the Fill-in Blanks and Word Answer Exercises, as many as 6 possible correct answers can be registered. This is more flexible than Digital Chisel, but it still pales before SuperMacLang's unlimited capacity of right/wrong answer register, each associated with a different feedback message.

In the Introduction screen, the instruction phrase "Enter Name" cannot be modified. It would be convenient if an author can flexibly choose the most appropriate words (e.g., "Enter ID Number").

Despite its WorldScript support, font types in some fields (e.g., Hint) are fixed, and changing it would require installation of a third-party utility such as Font Patchin' (freeware) in the control panel, to override the application's font specification at the system level.

This make-shift approach does not provide an optimal solution in a truly multilingual lab, where various WorldScript fonts need to be flexibly displayed to meet the needs of learners of different languages. A flexible font choice ought to be provided at the application level.

Furthermore, the fairly powerful set of text pattern-matching formulas in Free Format exercises are hardly usable when the text is typed in WorldScript because many formulas require a between-word space in the Roman-Alphabet mode, whose internal representation is different from space in non-Alphabet modes. Moreover, it is not a common practice to space out each word in the standard orthography of such languages like Japanese.

Question Mark's cross-platform support is a plus for institutions/organizations that accommodate multiple platforms; on the other hand, some functionalities of the Macintosh version are compromised for the sake of the compatibility with its PC counterpart. For example, an automatic jump from one exercise file to another is possible only when the destination file's name is no longer than 8 characters, which is an obvious legacy of the MS-DOS notation.

In the experience of the present reviewer, the bug fix team of Question Mark Computing in London is reasonably responsive to users' needs. One remaining bug is worth mentioning:

Even if computer marking is turned off for a question (i.e., there is no "correct" or "wrong" answer), if a student is allowed to retry, the software insists that a student's response is "wrong". This feature is annoying because sometimes teachers have their

students type in such factual information as the class session they belong to, etc. (Students end up receiving error messages to whatever they have typed in.)

Finally, occasional “modula-2” type errors have been reported in our 680x0-based Mac lab, when running a question file in which questions are randomly chosen from a large number of items.

Wish list:

- Response-sensitive feedback;
- More lenient type-in answer length;
- More flexible branching capabilities to enable full-fledged adapted testing;
- User font selection in all fields (including Introduction and Hint);
- Pattern-matching formulas compatible with WorldScript;
- Richer media presentation;
- Macro support.

### **Evaluation of Libra**

Strengths:

- Libra is particularly appropriate for developing courseware that intimately annotates a videodisc (or a long QuickTime movie) title, by its rich learning support tools including a Video-script, on-line dictionary, and notepads. Since these ancillary tools are each created as an independent stack rather than a part of a courseware stack, they can be easily recycled throughout development. Furthermore, its time-control capability of QuickTime movies makes it possible to easily provide increasingly detailed/narrowly-focused hints by replaying different lengths of the same base material.

Its macro language (handler) support together with the HyperCard convertibility makes its potential even greater. Once it is converted into a HyperCard format, it is fully scriptable using the powerful HyperTalk language, which is a welcome feature for HyperCard veterans.

Limitations:

On the other hand, the current version of Libra is not usable as an assessment tool, because of its lack of a record-keeping capability. This is disappointing because a teacher wants to see what the learning process is like for various reasons: Even if an exercise file is created for instructional rather than testing purposes, s/he may want to identify major difficulties for students, etc.

Understandably, a type-in question does not provide a part of Libra's interactive exercises, considering Libra's origin as a comprehension activity generator. Nevertheless, the lack of an interactive type-in exercise narrows the range of possible activities.

Although Libra supports WorldScript, some pop-up window fields are unable to properly display WorldScript (e.g., Textual feedback; “Card Organizer” = Page list view; Alert dialogue).

Wish list:

- Learners' data recording and reporting
- More powerful editor
- WorldScript display in all fields
- Interactive type-in exercise
- Conditional branching of macro.

### **Evaluation of Digital Chisel**

Strengths:

- Digital Chisel is the most thoroughly object-oriented authoring environment among the four products reviewed here. It provides the most complete suites of multimedia presentations, including QuickTime, videodisc, digital sound, synthesized voice, graphics, two types of animations, and audio CD. The Library (media segment clipboard) it supports makes it easier to incorporate a large number of media components into single presentation material. Also, Digital Chisel can be used as an assessment tool (including listening test) on a single workstation on account of its record-keeping capability, which Libra lacks.

Digital Chisel is particularly suitable for giving listening comprehension tests because it can control the number of replays by the macro language it supports.

Limitations:

- On the other hand, it is cumbersome for a teacher to collate the test result in a large class because the performance record cannot be submitted across the network.

In many respects, the current version of Digital Chisel is not fully adapted to the network environment. Even though it is possible to access an exercise file across a network, only one learner can use it at a time. In the end, it must be installed on each local hard disk if it is likely that two or more learners will try to use the same exercise simultaneously.

Its exercise templates are not flexible enough in terms of their handling learners' responses. First, it ought to accept more than one typed-in answer as "correct": This is particularly important in a language course where variabilities in linguistic forms are the norm (e.g., "gray" vs. "grey"). In Multiple Choice and Picture Pick exercises, again, only one choice can be specified as "correct", whereas there are instances where two or more correct choices make instructional sense.

Its lack of response-sensitive feedback is also disappointing because students are often eager to learn why their answer is incorrect.

Although Digital Chisel supports WorldScript, some pop-up window fields fail to properly display WorldScript (e.g., Database Project Information, i.e., A scroll view of instructions, questions, and answers).

Wish list:

- Multiple right answers
- response-sensitive feedback
- Stronger editor
- File sharing
- Conditional branching of macro.

## Comparative Evaluations/Ratings

As the aforementioned reviews have revealed, there is no single “best” product in all features: Each has its strengths as well as limitations, which often reflect their origins (Tables 9 and 10).

Table 9.

*Pros and Cons of SuperMacLang, Question Mark, Libra, and Digital Chisel*

	<b>SuperMacLang(SML)</b>	<b>Question Mark(QM)</b>	<b>Libra</b>	<b>Digital Chisel</b>
Pro	Response to sensitive feedback Long type-in answers acceptable Authoring is easy to learn	Powerful learning record keeping and analysis Flexible test condition control Powerful editor Data security measures Authoring is easy to learn Cross-platform	Rich multimedia environment Macro support Versatile media annotation HyperCard conversion (scriptable)	Rich multimedia environment Macro support Media replay control Data security measures Flexible length of type-in answers
Con	Limited media presentation Editor not powerful enough Cannot collate multiple learners' records	Limited media presentation Some fields do not present WorldScript No long answer acceptable in type-in exercises	No learning record No interactive type-in exercises Some windows do not present WorldScript fonts	Inflexible response handling Exercise file multi-user sharing not possible Learning data cannot be submitted

		Expensive		across network Cannot collate multiple learners' records
Suitable uses	Small-scale, intimately response-sensitive tutorial development	Large-scale courseware development Online test	Media-rich presentation (in particular, intimate annotation of multimedia title)	Media-rich presen
As a Multimedia presentation controller	#3	#3	#2	#1
As a test manager (e.g., time control; weight; randomization)	#3	#1	N/A	#2
As a listening test manager(e.g., replay number control)	#3	#2	N/A	#1
Network file sharing	#2	#1	#2	#2
As an exercise tutor (e.g., response-sensitive feedback; alternative answers)	#1	#3	#2	#4
As a hypertext environment	#3	#3	#1	#2
As an exploratory learning environment	#3	#3	#1	#2

(e.g., learning aids)				
As an item bank manager(flexible editor)	#3	#1	#3	#2

SuperMacLang provides an optimal choice to create a small-scale, intimately response-sensitive exercise development project.

On the other hand, Question Mark would be more suitable for a large-scale courseware development project. It is also very powerful as an online test manager, particularly across the network.

If more elaborated multimedia and hypertext presentations are intended, Libra and Digital Chisel should be given consideration, because of their richer media environment together with a more flexible presentation on account of their macro support. If it is necessary to keep a record of learning, Digital Chisel is the only choice among these two. Digital Chisel is also amenable to creating a multimedia title by incorporating a large number of media segments from versatile sources, because of its media clipboard support.

For an intimate annotation of a small number of relatively long multimedia titles (e.g., a videodisc movie) which encourages learner-controlled exploration of the media space, Libra will provide a comfortable development environment.

## **Curriculum Integration**

Given the nature of the skills focused upon, it is neither effective nor recommended to design a language course which primarily relies on such online tutorial-type activities, unless the course is presented in such an adversative condition where human communication is rarely possible (e.g., distance education). These development tools are more properly used as supplementation to human interactions inside and outside of the classroom, perhaps as a part of self-learning activities in an open lab.

It is almost needless to say that careful course planning and intricate coordination are required so that human-based and computer-based activities will complement each other effectively. Indeed, SuperMacLang Manual explicitly claims that:

“While SuperMacLang can give the illusion of reality when QuickTime movies, images, and sound documents are used, its purpose is not immersion in a “real-life“ communicative situation but rather practice in learning the basic skills of the foreign language. As such, it fulfills a real need for foreign language learners.” (p. 3)

## **Concluding Remarks**

SuperMacLang, Question Mark, Libra, and Digital Chisel all provide very useful and user-friendly tools for language teachers who intend to craft on-line tutorials, most typically those focusing on certain discrete skills. By reducing the steps of on-line implementation to sheer typing texts and setting parameters, these tools have made the author

Whichever development tool might be chosen, students learn from courseware only to the extent that they are motivated to do so. The first challenge facing every instructor, therefore, is to prepare motivating and worthwhile learning activities. Computer courseware can at least be as interesting as a book/audiotape/movie can be because the development tools present a digital simulation of these media. Other conditions being equal, the sheer interactiveness can make it easier for learners to sustain their concentration for a longer period. Ultimately, the upper limit of the potential of computer-aided learning is in proportion to the ingenuity of the courseware author.

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## Acknowledgements

I acknowledge feedback on earlier versions of this review article from Mike Levy (CALL-EJ Online Co-editor), John Kleeman (Question Mark Computing), Jerry Dawson (Pierian Spring Software), Michael Farris (Southwest Texas State University) and William Armour (University of New South Wales). Andrew Westcombe's meticulous proofreading helped me improve the quality of the writing. This comparative review was undertaken as a part of an elementary-level Japanese courseware development project funded by the Quality Assurance Money (Faculty of Commerce and Economics, University of New South Wales). All remaining errors are mine.



## **Addendum**

Another educational multimedia authoring tool on the Macintosh platform, which is not included here because I had not been aware of it until I finished this comparative review, is Acrux Software's Teach!. Its product information is available from:

- Acrux Software
- Kromboomssloot 53, 1011 GS Amsterdam, The Netherlands
- Phone & Fax: +31 20 6261899
- E-mail: [info@acruxsoft.com](mailto:info@acruxsoft.com)
- Homepage: <http://acruxsoft.com/>