Microware Review

Authorware Academic and Authorware Professional, Part 2

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Part 1 of this review, published in the last issue of this journal, dealt with Authorware at a conceptual level; this part deals with the "nitty-gritty" details of how it works.

The task of creating CBI has recently become so much simplified and eased that one of the "grand old men" who pioneered much of the work done in Canadian CBI admitted that he felt like he had wasted much of 25 years working with the cumbersome CBI environments and authoring languages that were the state of the art before Authorware.

Authorware Professional (formerly called Best Course of Action) and Authorware Academic (formerly Course of Action) have so much authoring power in such a small package that with either one of them, a Macintosh Plus could run rings around most mainframe CBI systems of only a few years ago. During the eighties, a powerful (but expensive) CDC mainframe CBI system called PLATO more or less set the standard for CBI in terms of ease of authoring and sophistication of presentation to the learner. The people who created Authorware are former PLATOites, now spun off from CDC, and the Authorware course design software runs on the Apple Macintosh line. Once the course is designed, it can be ported down to other environments (e.g., DOS) for delivery to learners. Aversion of Authorware Professional for Windows 3.0 is scheduled to become available, probably by the time you read this. Although the Windows 3.0 version can be expected to be similar, the remainder of this review deals with the Macintosh version.

The general procedure for producing CBI with Authorware is to create and de-bug an instructional sequence, then "package" it (i.e., create a stand-alone run-time version of the sequence which can be used by learners). It is not necessary for each learner to have a copy of Authorware in order to use the packaged modules.

Both Authorware Academic and Authorware Professional are icon-based, object-oriented authoring environments: An author merely drags the appropriate icon (representing a desired action) from a storage spot onto a flow chart

depicting the course being developed, and the software does all the necessary code creation completely unobtrusively. The eight icons in Authorware Academic, and their corresponding effects, are:

- display   puts text and/or object-oriented or bit-mapped graphics onto the screen
- animation   permits simple motion of screen elements
- erase   clears screen
- wait   causes flow of course to pause
- decision   causes selection from among a set of attached icons
- question   presents a question, and provides feedback based on learner's response
- calculation permits arithmetic or logical control; also permits jumping to other files or other application programs
- map   groups individual icons to organize and modularize course

Authorware Professional has three additional icons:

- advanced animation   permits more complicated animations, including bit-mapped "movies"
- sound   plays a digitized sound file (digitizing equipment comes with the package)
- video   executes commands to display selected segments of a videodisc

For example, if you want to display something on the screen, then have a pause, then clear the screen and ask the learner a question, you would drag onto the flowchart, in turn: a display icon, a wait icon, and a question icon. Having done those simple actions, you would proceed to execute (run) the program. Authorware pauses whenever it hits an "empty" icon (one that has no information attached to it), so when the first display icon comes up, you are shown a blank screen, to which you can add text and/or graphics, using familiar Macintosh tools and techniques. The program then executes the wait icon, allowing you to specify a variety of conditions (e.g., wait a certain length of time, or until either the mouse is clicked or a key is pressed, optionally displaying a prompt for a response). When the wait conditions are met, the execution resumes, thescreen is cleared, and the question display is put on the screen. You type in the question, choose the type of answer you want (text, click or touch area, move object, pulldown menu, keypress, pushbutton, or conditional), and construct as many feedback paths and displays as are appropriate, using the same "let-it-run-until-it-stops,   then-fill-in-the-missing-information" approach. Authorware "knows" that some sequences of activities are

"normal", and defaults to them unless told otherwise. For example in the scenario above, it would not be necessary for you to use an erase icon *before* the question icon; Authorware anticipates that you would want the screen cleared first, and defaults to that condition. Indeed, one of the nicest things about using Authorware is the degree to which it anticipates what you want to do next and sets itself accordingly Not long after you begin authoring, you suddenly begin to realize how many things you didn't have to tell it to do-and it still did them right!

For displays, the full range of Macintosh fonts, sizes, and styles of text is available, in black and white or color, depending upon which Mac platform is being used. While screen displays can be any size, the run-time machine's characteristics obviously have to match the authoring machine's. In typical Mac manner, copying, cutting, and pasting text and graphics are possible making importation via the Clipboard or the Scrapbook quick and easy A simple, built-in graphics toolbox provides object-oriented lines, rectangles and ovals, with various fill attributes and display modes. (Because the toolbox is missing a few useful features-like object alignment, for example-and because an imported bit-mapped graphic becomes an object in Authorware it is useful to have another, more powerful, graphics program available to use'with Authorware.) Display effects include zooming and fading. In addition to simply placing text and objects where you want them on the screen, the option exists to place them according to specified coordinates, or to have coordinates calculated by the software.

The simple animation icon is of the fixed destination type: it can be used tocausean object to move from point A to point B, but not much more. The speed of the animation, or the time taken to execute it, however, can be controlled. (The advanced animation capability that comes with Authorware Professional is described below.)

Screen erasure is quite straightforward. The effects of zooming either to a point or to a line, or of fading out, can be combined with the erase icon.

As noted earlier, the wait icon may have conditions attached to it. If a certain amount of time is allocated during which the learner is expected to answer, it is optionally possible to display a small graphic representation of an alarm clock, indicating how much time is remaining.

The decision icon provides for branching of several types: sequential (go through each of the attached icons in turn); random without replacement (choose one or more of the attached icons, as specified, but never repeating the choices); random with replacement (same as the last choice, but permitting repetitions); or pick "nth" path (path chosen is based on calculations). The decision icon is one of the most important of Authorware's structures permitting the author to have the machine emulate human-to-human interaction, and providing for different machine reactions to different learner actions.

Using one of the seven types of questions (listed earlier) available with the question icon makes it easy to require interactivity with the learner. Text answer evaluation is very flexible, allowing capitalization, punctuation,

spaces, extras words, and word order to be selectively evaluated or ignored. Alternative answers are easy to specify. Wild card characters are, of course, supported. A simple form of parsing is available which requires the learner to match a specified number of words. A nice feature is incremental matching, a scenario in which the system remembers partial answers provided by the learner, and combines them to evaluate the whole answer. Clicking on an area is a familiar Mac activity, so "pointing" to a correct answer is easy for learners. In addition, learners can be instructed to drag screen objects to certain locations. Answers can also be provided by selecting from a pulldown menu, or by striking a key or combination of keys. Pushbuttons (Mac-like "buttons" on the screen activated by clicking on them) can also be used for answers. Conditional answers are typically logical or mathematical computations that direct the learner along a certain path, based on previous performance or other criteria. Feedback can be controlled with respect to amount of time taken to provide the answer, or with respect to the number of attempts made to answer the question correctly.

The calculation icon is an extremely powerful tool, providing access to more than 100 system variables and functions. Want to know how many times the learner got the answer right (or wrong) on the first try? Or what the learner's last answer was? Whether the Caps Lock key is currently depressed? How many days it has been since the learner last worked on the course? The third number in the learner's last answer? The cumulative number of questions the learner has been asked? Authorware remembers all those things, and many more.

The map icon represents a group of one or more icons, and is primarily a way of keeping the desktop from becoming cluttered. As you develop and extend sequences of icons and de-bug them, you can collapse them into maps-collections of fragments of instruction that work as you want them to. Indeed, as noted in Part 1 of this review, Authorware's approach demands this 'bottom-up" approach to planning a sequence (as opposed to a "top-down" approach typical of programming): You make the smallest, most central part of the instruction work properly, then you add a layer of instruction around it. When that all works, you add another layer, and so on. It takes very little time to get used to this approach, and once you've used it, it becomes second nature. The fact that you can edit anytime, anywhere, makes it easy. You can change the sequence of displays with impunity; Authorware keeps track. You can even change the name of a variable-making the change in only one place---and Authorware will make all the other necessary changes for you.

The advanced animation option expands the number of choices available to five kinds of animation: fixed destination (movement from point A to point B along a straight path, the same as in Authorware Academic); fixed path (movement along a curved or jagged path); scaled path (movement along a specified fixed path, with pauses permitted at points in response to values of specified variables); linear scale (movement from a starting position to a calculated position along an imaginary straight line); and scaled X-Y (move-

ment to a location — on- or off-screen — calculated from values of variables specified). Paths, once defined, are editable. By assigning different animations to different layers (thereby defining what will happen when the animated objects overlap) and by using the concurrency option, you can have several animations happening on the screen simultaneously

The movies icon that comes with the advanced animation option permits the playing back of bit-mapped sequences (up to 1575 frames long) that resemble movies. After inserting a movie icon into a course, you can adjust the beginning and/or ending frame of the movie you want displayed, the playback speed (frames/second), the size of the image (1: 1 – 3:1), and how long it should play (repeatedly, a given number of times, or until a stated condition is true). Concurrency with other activity (e.g., sound) is possible with movies, as well. The movies themselves are created in a stand-alone program, Movie Editor, that comes with the Authorware Professional package. You create a movie by drawing each frame pixel by pixel, using MacPaint-like tools, or by importing frames via the Clipboard. The frame size can be 32, 48, or 64 pixels square.

The sound icon works in a manner similar to the movies icon: A sound icon inserted into the course flow diagram calls up and plays a sound file. The sound file can either be created with such commercial packages as Studio Session (not provided) or with SoundWave (included with Authorware Professional). SoundWave is used in conjunction with the hardware provided to digitize sound from either a microphone (supplied) or other electronic source. Sounds can be recorded at 5.5, 7.5, 11 or 22 KHz. A waveform monitor option is available to set optimum gain. The sound can be edited and manipulated (e.g., speed, volume, delay, equalizing filters) before it is saved as a file which can be called up by the sound icon. External "hooks" exist for custom programming to be added.

The video icon permits program control of one of eight models of videodisc players. The functions available are those on a standard remote control unit: play, step, slow, and fast, all either forward or reverse; pause; starting and ending frame numbers; and freeze frame. Playback can be set to one of five speeds. As with movies and sounds, video can be concurrent with other activities, and the number of times it is to be played can be specified. Various degrees of control can be assigned to a student-operated controller.

As noted in Part 1, Authorware permits the use of models, which are fragments of instruction devoid of content-shells, really-that can be called up in their entirety and pasted into place. Thus if you have a CBI sequence which will use many different four-answer multiple-choice questions (to use a mundane example), where each answer has different feedback, you could make up one sequence of the appropriate icons (without putting in the content), and save it as a model. Then, when you need a four-answer multiple-choice segment, you choose that model from a menu, and paste it into place on the flowchart. Run the segment, and place the content into each icon as it executes. Saves hours and hours of repetitive coding!

The 'jump out" feature allows the author to permit the learner to use

another application program — a word processor or spreadsheet, for example -at specified locations in the course, then resume the instruction when done using the other application.

Again at the author's option, learners who quit an instructional sequence in the middle may be allowed to pick up where they left off or may be required to begin the sequence again, the next time they access the course.

Authorware comes with a tutorial manual and a reference manual with separate manuals for each of the sound, video interface, and advanced animation icons. By following the tutorial, you actually create a quite sophisticated instructional sequence designed to illustrate most of Authorware's features. The manuals are logically organized and well-written. A novice to CBI authoring (who knows how to use a Macintosh) can begin to create simple CBI in a matter of a couple of hours. Of course, mastering completely such a powerful program will take much longer.

As noted in Part 1 of this review, Authorware Professional makes it possible for the educator-author to begin creating computer-based instruction with a relatively small learning curve, yet provides sufficient power and flexibility to satisfy even the most experienced professional CBI author.

The inevitable question arises: How does Authorware compare to another much-touted piece of software, HyperCard? In an earlier review of HyperCard in this journal, I waxed enthusiastic about the potential of HyperCard for developing CBI. Now, at the risk of being accused of being overly enthusiastic I find myself wanting to do the same-only more so-for Authorware. Yet it's not just an either/or proposition. It's a little like comparing Apples and oranges (pun intended; forgiveness begged). Authorware is designed for the express purpose of producing CBI, while HyperCard is a somewhat more general-purpose construction tool which, with some effort, can be made to do many of the things Authorware can. On the other hand, HyperCard makes easy some things that Authorware would have trouble with.

Student tracking is an Authorware strong point; Recording and evaluating answers is quick and easy While it could be done with HyperCard, it would require considerable sophisticated HyperTalk code to accomplish. Authorware's animation is much more powerful than HyperCard's (especially Authorware Professional's). Authorware supports color, while HyperCard at this writing does not, and Authorware products can be ported to other platforms while HyperCard cannot. Both allow for quick and easy creation and importation of text and graphics, and both permit the relatively easy use of sound simple animation, and videodisc (although the sound tools provided with Authorware Professional are significantly more powerful than HyperCard's). Both have powerful internal programming features, and both permit user code to be "hooked" into them. HyperCard's powerful search features are not available on Authorware. Neither is the ready capability of creating hypertext links, although Authorware's "leaping" feature comes close. HyperCard's price (free) has to figure into the comparison. But I repeat: It's not an either/or question. The serious author of CBI will probably want to use both, jumping

(invisibly to the learner) from one to the other as necessary to capitalize on their strengths.

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