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Computer-assisted Instruction in Academic Libraries

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Application Report:
COMPUTER-ASSISTED INSTRUCTION IN ACADEMIC LIBRARIES

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The implementation of a computer-assisted instruction package to supplement college-level bibliographic instruction is described. An outline of goals and objectives for an introductory package and a sample segment explain the technique for creating software locally, allowing for custom design. The use of sample materials permits student-tool interaction in a realistic exercise while also taking advantage of the computer's capabilities. Using locally available hardware with librarian-created text allows for subject-specific lecture presentations, elimination of repetition, and immediate instructional feedback. Results from use of materials by almost 2000 students are summarized.

One of the traditional problems facing librarians involved in bibliographic instruction is how to present the introductory one-hour lecture effectively. At the University of Kentucky M. I. King Library, the use of a computer-assisted instruction program to enhance the one-hour lecture has been extremely successful. It reduces some of the need to review basic library skills and allows more concentration on subject-specific tools. Students benefit in other ways as well. They receive immediate feedback through the program. The program is effective in dealing with the variability of students' library experience: it is flexible enough to provide a solid introduction for inexperienced students and a useful review for those who have used the basic tools before. In an initial search for similar programs in academic libraries, we found that computer-assisted instruction in academic libraries was popular for a time in the early 1970s (Chambers & Sprecher, 1980; Culkin, 1972; Huston-Miyamoto, 1980; Tallon, 1982). Currently, it is regaining popularity with the advent of microcomputers.

Assessing Problems
Two of the traditional problems associated with CAI are difficulty in making it a realistic exercise in library tool usage (because of the "artificial" nature of computer terminals) and difficulty in incorporating it into an instruction program on a large-scale basis (because of hardware expenses). The presence of 23 terminals in M. 1. King Library provided the means for a large scale implementation of the program but at the same time limited us to the use of a Prime 80 minicomputer without graphics capabilities. This limitation, however, solved the problem of making the program a realistic exercise because (as discussed below) it forced us to explore another way of presenting the material.

Designing Software
After our search for ready-made bibliographic instruction software suitable for college-level bibliographic instruction proved unsuccessful, we decided to write our own program. The obvious advantage of in-house programs is that they can be made specific to individual libraries. Our collection, for example, uses both Dewey Decimal and Library of Congress call numbers; we are decentralized, with 14 branch and associate libraries; and our filing system varies from the systems used in some libraries. We were able to design our in-house program with an emphasis on these distinctions.

Experience with Programming
Lacking programming expertise (we had each had one general programming class), we began the project by consulting our computing center about the procedure for writing an instructional program. The computing center gave us a brief introduction to the authoring language PILOT. Similar authoring languages are available at most universities for use with the university computer system. Authoring languages also exist for most microcomputers, so librarians can write their own programs regardless of available hardware and with a minimal amount of programming expertise. Our own lack of expertise eventually proved to be an advantage because we chose the simplest programming approaches, making the basic programming format easy to repeat and implement.

Goals
Once we determined the feasibility of writing our own program, we defined the environment, goals, and objectives (see Appendix). Given the format possibilities of PILOT, we chose to give brief textual explanations followed by short-answer questions pertaining to that information. In most cases no more than two screens of explanation appear before each question, so students interact often. This also keeps the content to a manageable amount for student comprehension and retention. The number of chances to answer each question can be controlled by the programming; giving the students three chances makes sure most students have positive experiences without the frustration of an infinite number of tries before they can proceed to the next question.

As noted above, we solved the problem of making the program a realistic exercise by exploring another way of presenting the material. Instead of using graphics to illustrate the use of specific tools, we followed the example of an approach used at Ohio State University in the early 1970s (Clark, 1974). Students respond to questions from the terminal by actually consulting the tools they are learning about. This method has greatly enhanced the success of the program. Libraries may want to consider this approach regardless of whether they have graphics capabilities.

Sample Materials
Multiple sets of sample materials allow several students to work on the program at any given time. Since our program is designed for introductory instruction, these sets include sample card catalog drawers with appropriate duplicate cards from our public catalog. In addition to cards for specific questions, additional cards make the exercise more realistic, particularly for illustrating filing rules.
Copies of the 7th edition of the Library of Congress Subject Headings (LCSH) permit student CAI use without removal of any current materials from public use. Superseded copies of Social Sciences Index serve the same purpose.

The cards in each sample drawer are identical, as are the multiple copies of the LCSH, so only one set of answers is necessary. (Cards may eventually need to be replaced due to wear and/or vandalism, but in two years of use by nearly 2,000 students, they have held up surprisingly well.)

The periodical indexes, however, necessitate finding answers across all issues that will be correct for the same question. It is therefore necessary to try various questions in each sample issue to prepare this part of the program, keeping an eye out for any idiosyncrasies that may cause confusion. Most authoring languages permit multiple answers (which is also useful to allow for common misspellings and other alternative answers). Most authoring languages also restrict the space for answer matches to one line of programming. When long answers are necessary (e.g., article titles), keywords can be used for the answer matches. As long as the keyword appears in the student’s response, the program will interpret the response as correct.

Any available sample materials can be incorporated into a program. We have used the same basic idea with different sample materials for more advanced programs for a scientific and technical writing class and a business writing class.

Question Format

The basic format for the questions in each section consists of the following components:

**SAMPLE**

T: ********** SUBJECT HEADINGS **********

: Look up the subject heading LAWRENCE, DAVID HERBERT, 1885-1930. Type the NUMBER OF PAGES for the book listed under this subject heading and press RETURN.

C: W = 0
C: G = 0
T: A:
M: %110!%110!One hundred and ten!one hundred ten
CN: G = G + 1
CY: R = R + 1
TY:
TY: Very good; personal names as subjects are inverted and often include birth and death dates. This is a book ABOUT Lawrence, not by him.

JY: *Ques7
CN: W = W + 1
CN: (W = 3): I = I + 1
T(W = 3):
T(W = 3): The book has 110 pages.
T: J(W = 3): *Ques7
TN: Try again. Personal names as subjects are inverted (last name first), just like author listings. Therefore, look up this subject heading in the L’s. Choose the card with ONLY the above subject heading; the cards behind LAWRENCE, DAVID HERBERT, 1885-1930, are more specific. (Note the extra information: LAWRENCE, DAVID HERBERT, 1885-1930—KNOWLEDGE—GERMANY.)

: Remember, the number of pages is listed after the publishing information, at the beginning of the next paragraph. Type in the NUMBER OF PAGES for this book and press RETURN.

Documentation for specific authoring languages is necessary since each differs somewhat. But the basic structure of this sample could serve as a guide to more authoring languages and could be adapted to present any specific tool. We used this same basic format, with appropriate sample materials, in the programs for the business and technical writing classes.

Access to the Program

To facilitate broad access to the program, the computing center created a special package that allows for individual passwords, automatic logout, and automatic scoring printouts. Therefore, students can use their individual password to access the Library CAI package, and upon completion, be automatically logged out and receive their personal score sheet at a nearby printer. This process can also be written into most microcomputer programs.

Lectures

From the beginning, we felt strongly that the CAI package should not replace the librarian contact gained in the one-hour lecture, but that it should reduce time limitations by eliminating repetitive explanations. Lectures now concentrate more on research strategy and subject-specific tools related to the student’s assignments. Briefly during the hour students are introduced to the computer package.

Advantages

The advantages of using our minicomputer became evident as we worked on the program. Since the equipment was already available, there were no hardware expenses. And, while the money expended for software creation involved our staff time, we gained invaluable experience that we now use in creating additional packages. In addition, because the library is an instructional unit, computer usage is free. Finally, excellent consultants at the computing center helped with programming problems and implementation. For these reasons, libraries without access to microcomputers may want to explore using their university computer system.

Problems

The few problems encountered primarily involved the hardware. Since the computer terminals belong to the computing center, the library does not have exclusive rights, and at peak times terminal access is limited. The students are restricted to the terminals located within the library because of the sample material (which would be difficult to secure in other locations), but this is a useful limitation because it brings the students to the library where the materials they are learning about are available.

Reactions

A memo to the freshman English instructors at the beginning of the spring 1984 semester described the program and invited them to try it with their classes. The response was excellent, with approximately one-third of the classes (500 students) using the CAI package.
Reactions from these students, both oral and from written evaluations, has been overwhelmingly positive. Of the 165 students polled, only seven answered negatively to the following question: "What did you think of the method (i.e., by computer) by which the information was presented?". The rest answered variously that they liked using a computer, that it was fun, interesting, effective. In succeeding semesters, requests for all three of our CAI packages have far exceeded those for the written assignments.

Our own reaction has been positive as well. We find that the introductory one-hour lecture is much more effective when we spend more time on theory and subject-specific sources. With automatic grading, there is no longer a need to devote staff time to this labor-intensive task. The success of the initial program led us to write the programs for the business and technical writing classes, and other programs are planned, including a package for an experimental psychology class. As noted before, the same basic format can be applied to appropriate tools for each package.

Conclusion
Academic librarians with access to either a campus computer system or to microcomputers should explore computer-assisted instruction, specifically by writing their own programs to fit specific needs and using sample materials to allow hands-on experience, as a means to supplement the one-hour lecture.

REFERENCES

APPENDIX

Environment
Initial instructional packages will focus on (1) the author/title card catalog; (2) the subject card catalog plus the LC Subject Headings; and (3) Wilson Company periodical indexes. The packages' availability must be flexible to work around terminal limitations (the 23 terminals in the Library Instruction Room are heavily used; peak times such as midterm and finals may cause congestion, thereby limiting access to the packages); it must also meet the variable need of instructors' schedules.

The program should be limited to a maximum of 90 minutes execution time, preferably no more than 30 minutes per package.

Goals
The CAI package will supplement reference source information coverage provided in instructional lectures and tours, emphasizing hands-on experience with sample card catalog drawers, LC Subject Headings, and Wilson periodical indexes.

The program will meet variable student needs through a selective menu or "jump" procedure, e.g., by providing explanations for students who miss specific questions.

The program will provide a user friendly interface, i.e., it will present a minimum of "interference" to the students' use of the packages.

Objectives Outline
A. CAI ACCESS
A written document (preferably one page) will provide terminal use instruction concerning:
1. login
2. password and/or package access
3. cursor movement and purpose (including correction)
4. use of <cr> for sending information
5. printing
6. logout.

B. AUTHOR/TITLE CATALOG
1. Students will know the purpose of the author/title catalog, especially in terms of "known material access."
2. Students will recognize the location and form of author (including corporate author) entries.
3. Students will recognize the location and form of title entries.
4. Students will be able to look up documents through an awareness of the catalog's alphabetical rules, including recognition of stop words, "nothing before something," and abbreviation alphabetization.
5. Students will recognize the location and form of basic publishing information.
6. Students will recognize the location, form, and use of pagination and other descriptive notes.
7. Students will recognize the locations, form, and use of tracings.
8. Students will recognize the location, form, and use of call numbers, including the distinction between LC and DDC numbers; they will also recognize branch and reference abbreviations, as well as the special location symbols.
9. Students will be able to use stack guides for locating materials.

C. SUBJECT CATALOG AND LC SUBJECT HEADINGS
1. Students will know the purpose of the Subject Catalog, including single word, phrase, inverted, hyphenated, and parenthetical headings.
2. Students will recognize that place names, personal names, and organizational names are possible subject headings.
3. Students will understand the filing rules of the various subject heading forms.
4. Students will understand that boldfaced listings in LCSH signify subject headings used in the subject catalog.
5. Students will understand the purposes of scope notes.
6. Students will understand "see," "sa," "xx," and "xx" notations and be able to find appropriate cross references.
7. Students will understand geographical and LC listed subheadings and will be able to locate them in the subject card catalog.
8. Students will recognize that proper names not listed in LCSH may be used in the Subject Catalog.

D. WILSON INDEXES
1. Students will understand the value of indexes for currency and topic specificity and their varied focus on journals and magazines.
2. Students will understand the time coverage divisions of the indexes, including the distinction between the hard and soft cover editions.
3. Students will recognize the variety of subject headings used in periodical indexes.
4. Students will recognize the format of subject headings and subheadings and be able to use "see" and "see also" references.
5. Students will recognize the format of citations and the purpose of each constituent part.
6. Students will be able to look up periodical abbreviations in the front of the indexes.
7. Students will understand the use of the book review section of Wilson Company indexes.

E. FEEDBACK
1. Students will receive personalized responses to their answers that (a) tell them if they are right or wrong and (b) reiterate the purpose of the information they have learned.
2. Students will receive a score-sheet that (a) is easy to retrieve for package-completion verification, (b) gives the students a positive feeling about what they learned, and (c) allows us to statistically measure the effectiveness of each segment.