

The Evaluation of Microcomputer Software

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EVALUATING AND SELECTING MATERIALS for libraries has long been one of the most important responsibilities of the profession. With the advent of each new technology, in this instance the microcomputer, yet another set of problems and concerns in this evaluation of materials has emerged. Microcomputer software provides the logic instructions to the hardware and enables the machine to translate those instructions into desired outcomes. Alan Kay has suggested the metaphor of a musical score as a means of grasping just what microcomputer software is and does.¹ Essentially it is not software in general that is so important, but what specific applications software permits us to do in the best possible fashion to reach our objectives.² Software offers the opportunity to do something, but it does not explain how that "something" may be applied to library problems.

Virtually all libraries are now using some form of microcomputer technology in their internal operations, and the number offering user-specific microcomputer services is increasing rapidly. One of the most difficult things to do in writing about the evaluation and selection of microcomputer software surrounds the distinction that must be drawn between acquiring software for managerial purposes within the library and acquiring software for general patron use. This article draws the distinction and introduces some of the basic types of software both for

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library management and for patron use. Then it examines some of the problems in the evaluation and selection of software, and finally it reports on a brief pilot study and responds to the concerns voiced there by suggesting the beginnings of a model for library staff development.

Acquiring Software for Managerial Purposes

Technology has imposed on librarians and other professionals the need to respond ever more quickly and with greater knowledge and detail when addressing administrative issues. At the same time, the microcomputer is a tool that offers a variety of means for addressing such issues.³ Word processing software, spreadsheet software, database management software, online public access software, and electronic messaging software are but a few of the examples of software for managerial purposes now being used in libraries. As the use of such software increases, librarians must develop the skills to evaluate and select these materials efficiently and effectively.⁴ The difficulty for many librarians at this stage is that they do not yet have a clear enough understanding of how, for instance, database management programs can help us in our work to make the critical evaluative distinctions among various database management software.⁵

Word Processing Software

Word processing programs permit the establishment of easily created, stored and retrieved text files for targeted communications such as letters, memos, procedures, manuals, publications, guides, and reports. Such files may be used repeatedly with only minor revisions, saving a great deal of time and offering a more cost-efficient way to communicate and to conduct business. Word processing programs may also be useful in the preparation of more complex planning documents or grant proposals. Often staff have used dedicated word processors (those computers modified in the factory to perform only as word processors) and find essential the use of function keys, the elaborate menu screens and the clean approach to control of texts and text files. Dedicated word processors, such as those from Wang and Digital Equipment Corporation (DEC), make the task of word processing simple and comfortable for the user. The move away from dedicated- to multiple-function machines is a cost-efficient one, but also it is one which reflects the desire of staff to exploit the versatility of the computer. Software programs are now available that are highly derivative of traditional dedicated word processors. An example is MULTIMATE, which provides some of the best features of a dedicated program.⁶ This is

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just one of many word processing programs now on the market, and the competition among word processing software producers is fierce. Since a great deal of time and effort are required to master most word processing programs, users often develop an almost disciple-like loyalty to their particular software. Obviously, the selection of word processing software should be dependent upon the needs of the institution rather than on a popularity contest among items in the marketplace.

Among the key questions in selecting a word processing package are:

1. Who will use the word processing software and what skills do they bring to a new software package?
2. What tasks will the word processing software be employed to perform?
3. Can the word processing software be modified or customized to meet user needs?
4. What extra features are provided with the word processing program such as checking spelling and merging addresses for mailing?

Often potential users believe that they need a sophisticated program, when all that is required is a rather simple text-editor/formatting program. If footnotes, elaborate citations and complex formatting of the pages are required, then obviously the word processing program must be able to accommodate this complexity.⁷ The training time required for highly elaborate word processing programs may be a factor in their decreasing acceptability to staff.⁸ For example, many users find WORDSTAR's on-screen menus make it easier to learn than MULTIMATE, FINAL WORD or WORD PERFECT, although much of that decision is based on willingness or unwillingness to learn intricate command structures.⁹

Spreadsheet Software

Spreadsheets permit budget analysis that was not possible without a great deal of time and expertise in the past. It is now feasible to plan and print out alternative budgets that change according to changes in projections made by administrators and staff.¹⁰ The financial planning aspects of spreadsheets are a realistic contribution to planning processes. However, it is far too easy to fall into the trap of producing complex-looking documents that have little or no substance. All too often, elaborate printouts of spreadsheets are used as a means to "snow" a board, staff or others from whom support is sought. Spreadsheets are

not meant to avoid the obvious responsibility of cost-efficient planning. Staff need to grasp what is feasible as well as what is possible in the planning cycle. One obvious criterion for selection of a spreadsheet would be to know what configurations of the budget might be best explained or documented through a spreadsheet software package. Spreadsheet programs may also be used for inventory control and may be helpful in keeping track of collection management decisions. To select a spreadsheet, one needs to be assured that it will hold the full dimensions of the budget or inventory as well as all of the formulas needed for computation. It should have clear and precise report features and it should be easy to edit the cells—i.e., each of the “slots” in the rows and columns on the spreadsheet.

Database Management Software

Selecting a database management program is one of the most rigorous selection problems. The ability to store and rapidly retrieve information that is indexed by keyword is a basic requirement. Boolean logic should be operational for retrieving data in a search. The potential user should critically examine the report functions and the resulting report formats supplied by the database management software. It is a question of both size and speed of sorting. An example of a simple software package is PFS-FILE that offers a small database structure but does not have the capacity to do all of the tasks that might be essential in library operations.¹¹ Software such as dBase III is much more powerful, but it demands more skill of the user in setting up the files and records needed to make this relational database work.¹² A key factor in the selection of any database program is *size retention*. How much space does the program allow for a record and how large can an individual file field be? For instance, improvements in earlier versions of dBase II are evident, and dBase III offers greater record space and speed in processing records, but it also offers users assistance through on-screen help menus. The isolation and intimidation of the “.” prompt on the screen in dBase II are now gone.

Integrated Software and Window-Oriented Display Software

A great deal of interest is engendered by the concept “what you see is what you get.” The user’s need to be sure that what appears on the screen is precisely what will appear on the output is a prime force in some selection decisions. Of course this is an aspect of the move to increased “user-friendliness,” which may not be as important as we have been led to believe. If the objective of microcomputer software is to make compu-

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ter use easier, and if a secondary objective is to provide the power evident in mini- and mainframe computers, then *windows* are a move in that direction.

There are programs that combine two or more of the previously discussed functions through Integrated Software and Windowing which creates an operating environment for the user. Some software is written at the system operational level while other software accommodates to the applications level of existing software. Software such as the earlier versions of LOTUS 1-2-3 or the sophisticated packages FRAMEWORK or SYMPHONY, or the newer packages VisiON or DesQ are examples.¹³ As new software packages penetrate the market, new demands will be placed on administrators for keeping up the quality of managerial output while simultaneously shortening the timeframe. Some newer integrated software packages are heavily derivative of the work done by the Smalltalk research group at Palo Alto (PARC) that employ hand-held mouse devices and bit-mapped displays. Overlapping windows and pointers are growing in popularity and seemingly attract the user as a more useful and comfortable approach.¹⁴ Both FRAMEWORK and SYMPHONY are integrated software that offer users a great deal of capacity in one program. Some have indicated that FRAMEWORK is more attuned to word-oriented persons but has the power comparable to number crunching programs, whereas SYMPHONY is more attuned to numbers.

Windows permit users to bring up separate boxes on the computer screen that may hold different portions of their work. The new systems permit movement among these boxes thus allowing the building of a total environment. When choosing a system of this type, certain questions are important to ask:

1. Can the institution afford to replace existing applications software to purchase a new system?
2. Can the institution afford to have customized software written to permit full use of this type of new environment?
3. Will current files be transferable into this new environment?
4. Is the box (window) structure one that is comfortable for users?
5. Does the new software have bit-mapped or character-based graphics?
6. What will be the timeframe in learning a new program *v.* the cost savings once that program is operational?
7. Are there additional or hidden costs—e.g., is additional hardware required to accommodate the new environment?

Online Public Access Catalog Software

The area of software for the stand-alone online public access catalog (OPAC) is growing, particularly in small libraries such as those in schools. A study examining the question of standardization of entry is in progress at Columbia University.¹⁵ Here the questions of standardization of entry in both input and output are critical, especially as we move toward a future in which local area networks (LANs) may be more and more important. Some software is limiting in what it will permit at the input stage, thus forcing users to enter either abbreviated or truncated forms or even to omit data. Such decisions are left to the user and lead to a lack of standardization. Nonstandard records are particularly significant in resource sharing, where it is desirable to search and index records by field elements. The decision to purchase stand-alone systems should be made with care and with a realistic vision of just what is wanted from the system. Many stand-alone systems are large enough to hold the number of entries for a small school or public library (between 20,000 and 60,000 volumes), but they require a hard disk unit.¹⁶ Since such programs have a predetermined input pattern, adjustments may have to be made to satisfy the needs of a union catalog. In addition, the question of increased multitasking is a question that should be addressed in selection. Frequently such multiple tasks as acquisitions, circulation and even inventory systems are now included in these stand-alone systems or such tasks are potentials for later inclusion.

Bibliographic Citation and Presearch Software

Another area of increasing concern involves the use of bibliographic citation/control software packages. Although most often used by individual scholars, such software packages are of growing importance in libraries, most often for reference staff or for those responsible for bibliographic instruction. Victor Rosenberg's software, PERSONAL BIBLIOGRAPHIC SYSTEMS, is complex, but it seems to address the scholarly need for complete citations, including all media formats. Truncating data elements and truncated search capabilities may be desirable in bibliographic databases, and some bibliographic software packages allow a great deal of abbreviation and truncation. This differs from program to program.

Increasingly, reference services are using microcomputers as front-end processors to access large database services such as DIALOG or BRS. The new software for offline search formulation and database access is of importance. IN-SEARCH permits setting up a search stra-

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tegy at the microcomputer before invoking the costly online time connections to the commercial database/vendor service.¹⁷ The key question in this instance is whether these software packages are the most useful approaches for reaching client needs or whether they simply are devices for drill and practice for library staff. In some cases, especially with less-experienced searchers, these software packages may actually be cost-efficient methods of searching large databases.

Electronic Messaging Software

Electronic messaging software is increasingly important. Many institutions, particularly colleges and universities, are moving toward centralizing their communications and computer technology. Librarians are finding they must become involved in the organizational restructuring that centralizes administrative support for computer technology. Although decentralization may be a major trend, there will be a critical need for interfacing various functions among decentralized units. Communication protocols are critical. More and more faculty and students in universities have microcomputer access and seek to communicate electronically. What Thomas calls "telecommuting" may become important even in libraries, since some personnel may seek to complete a great deal of their work at home.¹⁸ For instance, it might be possible to complete database searches at home or to develop bibliographies, manuals or guides, and send them into the office via the modem. Software that allows institutional communication and extra-institutional communication is something which libraries must be alert to in the immediate future. One popular program is KERMIT which functions as a communication protocol and does it efficiently.¹⁹ For instance, it is now possible to connect through KERMIT to the Decnet System at Columbia University and to access the Serials Project at Teachers' College through a hosting protocol. From home, a user connected through KERMIT may check which journals are available in the Teachers College collection. This project is only a beginning, and it will be enhanced by the online public access catalog, Columbia Libraries Information Online (CLIO). Such varied uses of electronic messaging software show that routing protocols must be applied and examined in some library situations.²⁰

Another aspect is desirability and applicability of using and accessing various electronic mail (e-mail) systems for library applications. These systems permit the user to enter various electronic bulletin boards and to communicate with others across the country. Standard communication devices (modems and language protocols) are needed. For exam-

ple, using a Hayes Smart Modem with SMARTCOM II as the protocol language, it is possible to communicate with databases and a variety of institutions in a network mode. The development of the American Library Association's ALANet is an example of the increasing interest in and use of a system devoted to library activity. Using ALANet permits the various users to contact one another throughout the country and to communicate quickly and efficiently.

Acquiring Software for General Patron Use

Should libraries collect microcomputer software for their clients' use? If so, what kind of software should be collected? Should it be allowed to circulate or does the library provide a microcomputer for on-site use by patrons? How may access be assured to the hardware as well as the software? If the library assumes the responsibility for providing software for home use, how many and which version(s) of the software will be purchased, for which mutually incompatible microcomputers? Should a faculty member in a major university expect the library to have a variety of database management programs to use and to experiment with for courses and research? One excuse some librarians use to avoid dealing with such problems is saying that public access software should not be provided because it is too easy to copy most disks. At the same time it seems many libraries have chosen not to provide software to the public rather than to concern themselves with either the managerial or the intellectual issues at stake. From a managerial point of view, librarians may be required to develop guidelines for use of licenses that may differ from those applying to the general public or to the profit-making sectors. Intellectually, if we consider software to be a type of content that permits a user to interact in some specified fashion, does not the library have a responsibility to make this content available to its clientele? Just as a faculty member should be able to examine a variety of sources in making a decision about course materials or about a research design, so too, a faculty member (or other member of the library's public) should have available a variety of software. For instance, all libraries have dictionaries in their collections. A first level of use for such dictionaries is spelling verification. But how many libraries offer their users a program that checks spelling? When the *Oxford English Dictionary* (OED) is on disk, will libraries purchase it or refer the user to hard copy only? To be sure, this is not a simple problem to solve, but we need more study of the role of the library in providing public access to software. We must seek a model of acceptable practice.

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Once a library makes the decision to provide software for clients, questions regarding the evaluation and selection of items that might be appropriate for the collection must be considered. For example, should libraries collect software broadly representative of the entire collection? Should they purchase only popular items that would be in constant demand? Where will the collections of record be?

The problem of adding increasingly complex computer games and adventures is something that must be dealt with in any selection policy.²¹ Now there are highly creative games emerging that clients may wish to see and use.²² Certainly one could make a valid case for using adventure games and other computer games as a means of developing logical thinking and sharpening intellectual skills.²³

In the field of education, it may be relatively easy to devise a collection model. There are clear-cut choices of administrative software for classroom management and testing. Then there are the easily distinguished drill-and-practice clusters of software available in almost all subject disciplines. Finally, there are the subject-oriented simulation and other creative software items that are often useful adjuncts to the curriculum. Given these distinctions, setting up a collection policy that offers clientele a rich resource for research and practice is not so difficult in schools as it might be in other types of libraries. Even in the school setting, however, one must address the question of whether or not the school library media center should provide software for recreational, non-school-related activities. It is much more difficult to establish collection development guidelines in other libraries where lines of demarcation among software are not as clean.

The question of dealing with software for multiple varieties of hardware is somewhat easier, since the purpose of a collection is to have at least one item for use. Unless a purposeful decision is made to circulate software, using a one-item/one-machine system should be appropriate and should create less stress in the selection process. It may also presuppose that if only one or two types of machines are available this will be a factor in software evaluation.

Evaluation and Selection of Software

There are at least five key criteria for the evaluation and selection of software:²⁴

1. Does the program do what it says it will do?
2. Does it make use of the computer in an appropriate fashion?

3. Does the software require additional hardware in order to run satisfactorily?
4. Is the documentation clear and communicative? Will back-up services be available to the purchaser?
5. Is there a satisfactory reason to purchase the software for the institution?

If the computer software is used to mimic previous technologies and ignores the potential of what the new technology can do, it fails the user. If a program stops working when you are using it and leaves you hanging, it is not a useful program.²⁵ Although drill-and-practice, computer-assisted instruction, and classroom maintenance programs are all useful and even desirable, in some situations, they may be the best choices for stimulating computer use. Programs designed for children like ROCKY'S BOOTS and PINBALL CONSTRUCTION SET demonstrate a creative structure that increases the logical ability of the user while being entertaining.²⁶

The traditional sources for selecting microcomputer software for consideration are not as readily available as are those for other forms of media. Innumerable lists, both in hard copy and in online systems, exist for such selection.²⁷ (See appendix A for list of selected sources.) We still have not reached the equivalent of software approval plans or large-scale distributors and jobbers such as Blackwell/North America or Baker & Taylor.

Certainly one reason the approval-plan concept has not reached the software market is the ease of copying most disks. While libraries would not necessarily copy disks rather than purchasing them, it is conceivable that an individual reviewer might copy a disk whether or not the library approved the item for purchase. Increasingly, however, a disk is almost impossible to copy beyond one backup after which the disk is encoded to prevent additional copies being made. Indeed, many programs cannot be copied at all, or, if copied, it is clear on the master disk that this has been done. We have permitted circulation of recordings for years and few stop to consider how easy it is to copy a recording to a tape. Perhaps LANs will perform a switching service to load and control applications software for users in the individual libraries in a system.²⁸ The confusion between the technology and the content remains to be resolved.

Licensing Agreements for Microcomputer Software

A critical distinction in microcomputer software is between copyright—which protects all software—and licensing, under which most expensive software is sold. Licensing only permits one to use the

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item on the specific disk and only allows the making of a defined number of backup copies. The rigor of this system is interesting, and usually the customer benefits by being able to deal directly with the company that produced the item to obtain supporting documentation, replacement copies or new versions. This is a fascinating concept. When we order and purchase a book, we have no direct contact with either the author or the publishers. When purchasing software under license, we have a potentially intimate arrangement with the "author" and "publisher." But all of this is dependent on the licensing concept.²⁹ The customer who purchases dBaseIII produced by Ashton-Tate purchases the license to use that program, and the customer may telephone Ashton-Tate for assistance in program applications or for help in using it. Ashton-Tate will ask for the customer's license identification number, and with that the licensee is entitled to their help. (It does not matter whether the software was purchased from a discount house, a computer store or even a department store rather than directly from Ashton-Tate.)

Factors in Evaluation

Often, one may use alternative means for either examining or selecting microcomputer software, such as:

1. the professional colleague or informed hobbyist who has used the software and can offer information and criticism;
2. the review that appears in a reliable journal (this often means use of those journals devoted to microcomputers rather than traditional library journals);
3. the listing of the particular piece of software in books, articles or exhibits with enough frequency to catch attention (name recognition);
4. attendance at various conferences and exhibitions that concentrate on microcomputers; and
5. visitations to computer stores.

Although similar sources of information are used for the evaluation and selection of all types of materials, the specific persons, journals, books, conferences, etc. are often outside the traditional library sources.³⁰

The critical decision to purchase a given piece of software often is dependent on the knowledge of a staff member who has some familiarity with the software, and who suggests the item as a best buy. Although this may prove helpful, it should be seen as no more than a suggestion that should be examined in light of institutional needs. To accept the suggestion without examination may lead to a mind-set that forces users into a mental vise, precluding real analysis of why and how any given

program may work for the library or information agency. In short, knowing something about a particular program does not always lead to the best possible choices among the various programs available.

Timeframe of Evaluation

The timeframe allocated to evaluation of microcomputer software creates a problem in the paradox of extended time *v.* life of a program. By life of a program is meant the extent to which a program is viable in the marketplace. If we encumber evaluation of software with elaborate systems, we risk the possibility of finally achieving a superb evaluation only to discover the product evaluated has been replaced with a newly marketed item. Obsolescence in microcomputer software is remarkably swift and may be significant enough to plan alternative approaches for the timing of evaluative procedures. For software evaluation, the systems that have worked in the past are not necessarily valid. Elaborate systems such as that of Educational Products Information Exchange (EPIE) need to be contrasted with less complex systems that highlight only a few critical components to test.³¹ *Library Technology Reports* have also contributed to overall understanding of evaluative procedures.

Cost of Software

Software prices normally range from approximately \$50 to \$700, with most management applications priced at the upper end of the range. With discount software houses, the prices are markedly reduced. Still, for most libraries, each dollar is hard-earned and care in expenditure must be exercised. It is doubly difficult to justify the cost of software when it is so likely to become obsolete in relatively short periods of time. One of the costs hidden in the purchase price is updating the software by new releases of programs and creation of peripheral software packages to aid in use. We need to stop treating software as if it were a unique phenomenon and recognize that, just like the book or other sources of information, we continue to update, replace or simply add to the collection. In some cases, the cost of updating is borne by the producer and the purchaser gets it free (that is, without additional expenditure).

Access to Actual Software

There are very few examination centers in the United States that offer a wide range of software. Selectors fortunate enough to have a large computer store nearby may be able to preview software there, but this is not the normal, and certainly it is not the ideal, setting for evaluating

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and selecting library materials. Most distributors will not permit use of an item before purchase, although some software design companies will offer demonstration disks, not unlike the preview versions of audiovisual media. Unfortunately, however, some of these demonstration disks do not really provide enough information about the software or enough experience with the full range of the software capabilities, so it is difficult to use "demo" software as the sole basis for the selection decision. IBM and Prentice-Hall/Chambers have collaborated on what is called the IBM PC Apprentice Program which offers to students (high school through post-secondary education) workbooks and disks containing either the entire program (live code version) or at least a reasonable modified portion of the program.³² This program will include a very large range of software including JACK 2, OPEN ACCESS, SUPER-CALC 3, WORDSTAR, WORD PERFECT, dBase II, dBase III, and UCSD PASCAL. The programs include some of the most commercially viable and have only been changed to permit limited use (fifteen records or five pages of text or some such device) by the student. What this will permit is less expensive access to a large amount of software (mostly business-oriented) so that some experience might be offered to users before a full-scale investment is made.³³

Pilot Survey of Microcomputer Software Libraries

Although the literature does demonstrate an increased interest in and awareness of microcomputer software, it is not year clear to what extent libraries have actually become involved in software acquisition and in the necessary staff development that go along with this process. A small pilot study was designed to investigate library involvement in software acquisition and related tasks and to offer some descriptive data.³⁴

Thirty librarians in leadership positions in United States libraries—nine from academic, ten from public, and eleven from school libraries—were queried by telephone to survey their degree of involvement with staff development in microcomputer applications. (The author claims no more for the survey than that it tests the waters.) The following questions were asked and, in some cases, some additional commentary followed on the topic:

1. Is your library involved in any formal or organized evaluation of microcomputer software?
2. Does your library collection include microcomputer software? For administrative use? For client use?

3. Is microcomputer software included in the format statements of the collection development policy?
4. Is the software evaluated for staff use or patron use?
5. Who is involved in the evaluation? Administrators, reference librarians or technical services librarians?
6. Is the involvement by job responsibility or through personal interest?
7. If you had a staff development program, which objective would you rank as the most important (a) to develop an evaluation form for the library? (b) to make decisions about acquisition? (c) to raise questions on the applicability of software?

The responses to this national telephone mini-survey reveal only an indication of possible trends and of direction. Of the thirty interviewed, twenty-eight were involved in the evaluation of microcomputer software. The two, who were not—one academic and one public librarian—indicated that they expected to become involved in the immediate future. All respondents indicated that their libraries' collection development policy statements were broad enough to include all media, even microcomputer software, although several indicated that they would encourage revisions to be specific in mentioning this area. Of the thirty librarians interviewed, twenty indicated that the software purchased was for library applications; five school librarians indicated both administrative and patron use, with most emphasis on software for student use; and three public librarians indicated both. Twenty-eight indicated that staff were involved in evaluation and selection, with administrators and reference staff the most frequently cited. Answers to this question did not pinpoint precisely who was involved, since the response most often given was "a variety of staff." No one indicated that this form of evaluation was a specific responsibility within a job description, although many indicated that it was assumed and probably would be added in this next year. Some comments indicated that most often the evaluation and selection of software was started by one staff member with some experience with microcomputers. The last question on goals for staff development showed seventeen respondents placing the objective of decisions about acquisitions as a first priority, while ten indicated that development of an evaluation form was their priority, and three indicated that applicability was their chief concern.

One last question was asked on the general need for staff development programs which address the problems related to the evaluation and selection of microcomputer software. Overwhelmingly, the respondents (twenty-seven) indicated that they felt such a need. Many

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indicated that trial and error was the path they had followed and it was quite costly.

Although a rather primitive study, this survey does reveal that evaluation of microcomputer software is of some importance and that similarities of concerns emerged among the different types of libraries. The only notable difference was in the emphasis on users among school librarians. They indicated that library applications were the most difficult to acquire and justify. I started the pilot hoping to obtain some new information but only confirmed what I had suspected; that is, libraries were involved with software evaluation but staff development was not a major part of their concern. Only when I mentioned the advantages of staff development programs did I get positive response.

A Model of Competencies for a Staff Development Program

One of the obvious questions that emerges in this examination of software evaluation and selection in libraries is that of the competencies of the individuals doing the actual selection. What knowledge, skills and abilities should software selectors have? It is not the purpose here to set up a model evaluation form; there are many of these.³⁵ Rather, the competencies a staff member needs to make such decisions will be listed:

1. Fundamental skill in using a microcomputer, although not necessarily programming competence.
2. Fundamental ability to recognize what the mission or task of a specific program is and how that task/mission is matched to a particular library purpose or goal.
3. Ability to read and analyze documentation which accompanies software.
4. Ability to recognize error and/or false information if presented in the program. This would imply subject competence in the area.
5. Knowledge of a wide range of programs within a generic category. (For instance, knowledge of a number of word processing programs and spreadsheet programs rather than only the specific programs called WORDSTAR or VISICALC.)
6. Recognition of the value of communication beyond the immediate environment such as that offered through electronic mail systems and networks that permit interactive conferencing and other alternative means of communication.
7. Increasing ability to compare and contrast a variety of programs which have similar objectives.

Staff Development Options

The obvious question to ask is what implication the above competencies will have for either library education or staff development. Where is the staff to gain such competency? Those students currently completing graduate library/information service programs should be competent in these areas. The library might provide alternative programs for staff to acquire specific competencies or library schools might offer new patterns of continuing education targeted to library needs in microcomputer software selection. Self-tutorial programs designed at library schools may prove useful along with training programs sponsored by the libraries and taught by those who have the specific knowledge needed. (See appendix B for a list of corporate agencies in the training field.)

Many software packages provide either tutorials online or demonstration disks that offer the user a chance to test the program for the capabilities and applications desired. Other programs are so popular that additional tutorials have been developed by outside agencies and are on the market. Some have led to the establishment (and the demise) of a business.³⁶ Additional approaches are provided with programs such as the IBM/Prentice-Hall/Chambers Apprentice Programs described earlier. These tutorials are useful in the development of general familiarity with a variety of programs necessary for selectors.

An alternative means is the use of both audio- and videotape as a self-tutorial approach. The Apple Macintosh has an audiotape for the beginner that introduces the system. Several businesses have developed alternatives to the online approach with their video tutorials. Many short courses or workshops—most of them geared to specific software—are offered by training agencies and are options as a means of gaining competency in microcomputer use. Traditionally, such training was offered by sales representatives, universities or software developers, but increasingly it is provided by organizations for which these workshops or training sessions are the primary business (see appendix B).³⁷ In making a decision to use a training agency certain questions seem to be in order:

1. What is the ratio of students to teacher/instructor?
2. Where will the classes take place?
3. Will the sessions provide "hands-on" experience with both machines and software?
4. What materials will be available to the participants in the workshops?

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5. Will the material covered be at sufficient depth for the levels of understanding among the staff?
6. Will there be follow-up sessions for participants?

These training workshops might be used to provide orientation to specific software but also to provide a form of evaluation session for a variety of applications software.

Conclusions

The responsibility for collecting microcomputer software is a part of the overall collection management function of any library today. It requires a sizable amount of energy for library professionals to acquire competence in making decisions about microcomputer software packages. Certainly, the microcomputer user community, both within and beyond the library profession, will lend support to these concerns and will share its expertise. One of the truly frightening aspects of handling software decisions is that each day new journals, new software and new hardware enter the marketplace and these entries offer new and enticing options for software collectors and users. Librarians' efforts in acquiring competencies in software selection and evaluation will be rewarded in the professional community and in the larger user community to which librarians belong.

Appendix A

Selected List of Sources for Selection of Microcomputer Software

Selected Online Sources

(It should be noted that these sources have an online connect time fee attached to the use.)

Bibliographic Retrieval Services After Dark. 1200 Route 7, Latham, NY 12110 (518) 783-1161.

CompuServe. 5000 Arlington Centre Blvd., P.O. Box 20212, Columbus, OH 43220 (800) 848-8990.

The Source. 1616 Anderson Road, McLean, VA 22102 (800) 336-3366.

The Knowledge Index. DIALOG Information Services, Inc. 3460 Hillview Ave., Palo Alto, CA 94304 (415) 858-3777.

NewsNet. 945 Haverford Road, Bryn Mawr, PA 19010 (800) 527-8030.

Selected Guides and Sources

Bowker/Bantam 1985 Complete Sourcebook of Personal Computing. R.R. Bowker Co., 205 East 42nd St., New York, NY 10017 (800) 521-8110.

Datapro Directory of Microcomputer Software. Datapro Research Corporation, 1805 Underwood Blvd., Delran, NJ 08075 (800) 257-9406.

The Infopro Directory. Infopro, Inc., P.O. Box 22, Bensalem, PA 19020 (215) 750-1023.

InfoWorld Report Card. 375 Cochituate Road, Box 837, Framingham, MA 01701 (800) 343-5730.

LIST. Redgate Publishing Company, 3407 Ocean Drive, Vero Beach, FL 32960 (305) 231-6904.

MicroWorld. Auerbach Publishers Inc., 6560 North Park Drive, Pennsauken, NJ 08109.

19-Microcomputer Market Place. Dekotek, Inc., 2248 Broadway, New York, N.Y. 10024 (212) 799-6602.

Online Micro-Software Guide and Directory. Dept. S/D Online, Inc., 11 Tannery Lane, Weston, CT 06883 (203) 227-8466.

The PC Clearinghouse Software Directory. PC Clearinghouse, Inc., 11781 Lee-Jackson Highway, Fairfax, VA 22033 (800) 368-4422.

Resources in Computer Education (RICE). Northwest Regional Educational Laboratory, 300 S.W. Sixth Ave., Portland, OR 97204.

The Software Catalogue. Elsevier Science Publishing Co., 52 Vanderbilt Ave., New York, NY 10017 (800) 223-2115.

Software in Print. Technique Learning, 40 Cedar Street, Dobbs Ferry, NY 10522 (914) 693-8100.

The Software Source. Software Source, Inc. 2701 CW 15th Street, Plano, TX 75075 (800) 621-5199.

Selected Public Domain Software

(There are a number of public domain catalogs that are available but perhaps the best access is through the electronic bulletin boards for specific computers and that are often a

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part of a computer club. Access to such online systems is often free or at a minimal cost.)

Catalog of Public Domain Software for IBM Personal Computer. New York Amateur Computer Club, P.O. Box 106, Church Street Station, New York, NY 10008.

Kingcomm. Kingwood, TX (713) 360-1316.

Invention Factory. New York, NY (212) 431-1194.

The Software Library. Rockville, MD (301) 949-8848.

IBM PC Information Exchange. Chicago, IL (312) 882-4227.

Appendix B

Selected List of Training/Tutorial Companies

Self-Tutorials

(The companies listed below provide computer tutorials or other self-teaching products related to various software products. Most of the items available for purchase are within a \$50 to \$500 price range.)

Advanced Systems, Inc. 2340 S. Arlington Heights Road, Arlington Heights, IL 60006

American Training International. 3770 Highland Ave., Suite 201, Manhattan Beach, CA 90266.

ASI Microtutor Division. 155 East Algonquin Road, Arlington Heights, IL 60005.

Cdex. 5050 El Camino Real, Suite 200, Los Altos, CA 94022.

CES Training Corporation. 680 Kinderkamack Road, River Edge, NJ 07661.

Edutronics. 55 Corporate Woods, Overland Park, KS 66210.

Knoware. 301 Vassar St., Cambridge, MA 02139.

Peat Marwick. 810 Seventh Avenue. New York, NY 10019.

QED Information Sources Inc. P.O. Box 181, Wellesley, MA 02181.

Reston Publishers. 11480 Sunset Hills Road, Reston, VA 22090.

Training Workshops

(Training in the for-profit sector is often provided through an outside agency. The firms listed below offer training packages within a range of software applications. Some of the companies listed above also offer such training packages.)

Arthur Anderson & Co., Center for Professional Education. 1405 N. Fifth Avenue, St. Charles, IL 60174.

Control Data, Inc. 8100 34th Ave. S., Minneapolis, MN 55420.

Datapro Research Corporation. 1805 Underwood Blvd., Delran, NJ 08075.

IBM Product Center. Retail Marketing, P.O. Box 2150, Atlanta, GA 30055.

Systec Resources Corporation. 4324 Promenade Way, Suite 110 Marina del Rey, CA 90292.

Touche Ross & Company. 250 E. Wisconsin Avenue, Milwaukee, WI 53202.

References

1. Kay, Alan. "Computer Software." *Scientific American* 251(Sept. 1984):52-59.
2. There are three types of software: systems, applications and programming languages. (Among the most common systems software are: CP/M, MS/DOS and UNIX.) The concern in this article is with applications software. It should be pointed out, however, that no applications software can be run without a disk operating system. This article does not attempt to explore systematic methods of designing, implementing and maintaining new software in a theoretical sense. A true science of software development which will lead to quality in software is explored in *IBM Journal of Research and Development* 28(Jan. 1984). For those interested in UNIX as operating systems software, see the series of articles by Eric S. Raymond, "Live Free with UNIX"; Mark Zachman, "Understanding Unix"; Kaare Christen, "Taking the Cue from UNIX"; _____, "A UNIX to be Proud of"; and Tom Plum, "A Classy Idris in the UNIX Neighborhood." All in *PC: The Independent Guide to IBM Personal Computers* 3(29 May 1984):145-76, may prove helpful.
3. Pournelle, Jerry. "The Management Revolution." *Popular Computing* 3(May 1984):81-86.
4. Although British in scope and somewhat dated, several points are useful in: Tedd, Lucy A. "Software for Microcomputers in Libraries and Information Units." *The Electronic Library* 1(Jan. 1983):31-48.
5. Raduchel, William J. "A Professional's Perspective on User-Friendliness." *Byte* 9(May 1984):101-06.
6. The relationship of MULTIMATE to dedicated word processors, specifically to Wang, is explored in a review of MULTIMATE in Gabel, David. "Take a Memo with Multimate." *Personal Software* 2(Sept. 1984):83-94.
7. Since word processing programs should be assessed in terms of what they help accomplish, it is wise to read at least one standard text on writing such programs, such as: Fluegelman, Andrew, and Hewes, Jeremy Joan. *Writing in the Computer Age*. New York: Anchor Books, 1983. In addition, several computer journals contain reviews and lengthy critiques of specific programs such as: Krasnoff, Barbara, et al. "The Word on Word Processors." *PC* 3(4 Sept. 1984):112-86. The reader may find additional points of significance in "Publishers and Librarians: A Foundation for Dialogue." *Library Quarterly* 54(Jan. 1984):1-104.
8. For some programs the training time required for highly sophisticated use of a software package may be up to twenty person-hours and then, only with added time for practice does the person become proficient.
9. WORDSTAR 3.3. San Rafael, Calif.: MicroPro, 1984; MULTIMATE 3.22 East Hartford, Conn.: Multimate International Corp., 1984; FINAL WORD 1.16. Cambridge, Mass.: Mark of the Unicorn, Inc., 1984; WORD PERFECT 3.0. Orem, Utah: Satellite Software International, 1983. As with all programs, the date given in the citation is that of the version examined rather than the latest version that may be in release.
10. Although there are many spreadsheet programs available, at least three are among the most used and most powerful: SuperCalc 3. San Jose, Calif.: Sorcim Corp., 1984; VisiCalc. San Jose, Calif.: VisiCorp, 1979; and MULTIPLAN. Bellevue, Wash.: Microsoft Corp., 1983.
11. PFS-FILE. Mountain View, Calif.: Software Publishing Co., 1983.
12. dBase III. Culver City, Calif.: Ashton-Tate, 1984.
13. A rather extensive analysis of the power and potential of FRAMEWORK and SYMPHONY is found in Layman, Don. "Framework: An Outline for Thought"; and Baras, Edward. "Symphony: A Community of Information." Both in *PC* 3(7 Aug. 1984):120-35. This might be compared to an article by Allswang, John M. "Framework's Big Picture." *IBM PC Update: Products, Ideas & Solutions* 1(Oct. 1984):19-31. FRAME-

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WORK. Culver City, Calif.: Ashton-Tate, 1984; and SYMPHONY. Cambridge, Mass.: Lotus Development Corp., 1984. VisiOn. San Jose, Calif.: VisiCorp, 1984; DesQ. Santa Monica, Calif.: Quarterdeck Systems, 1984.

14. Markhoff, John. "Five Window Managers for the IBM PC." *BYTE: Guide to the IBM Personal Computers* 9(Fall 1984):65-87. Another approach to this topic is found in Miller, Michael J., and McMillan, Tom. "Windows While You Work." *Popular Computing* 3(May 1984):96-110.

15. Murphy, Catherine. "Microcomputer Stand-Alone Online Public Access Catalogs in School Library Media Centers: Practices and Attitudes Toward Standardization." Ph.D. diss.-in-progress, School of Library Service, Columbia University, 1984.

16. Several systems are on the market such as: COMPUTER CAT. Westminster Colo.: Colorado Computer Systems, Inc., 1982; and GAYLORD SCHOOL LIBRARY MANAGEMENT SYSTEM. Syracuse, N.Y.: Gaylord, 1984. A useful book on the question of access to media is Intner, Sheila. *Access to Media*. New York: Neal-Schuman, 1984.

17. IN-SEARCH. Santa Clara, Calif.: Menlo Corporation, 1984.

18. Thomas, Charles R. "Trends in Higher Education Computing." *EDUCOM Bulletin* 19(Spring 1984):2-10.

19. A two-part article appeared in consecutive issues of *Byte* on the structure and use of KERMIT. See: Dacruz, Frank, and Catchings, Bill. "KERMIT: A File-Transfer Protocol for Universities—Part 1: Design Considerations and Specifications." *BYTE* 9(June 1984):255-78 and _____. "KERMIT: A File-Transfer Protocol for Universities—Part 2: States and Transitions, Heuristic Rules, and Examples." *BYTE* 9(July 1984):143-45+. An interesting note is that KERMIT is the communication protocol sold with SCSS for the IBM-XT.

20. Hseith, Wen-Ning, and Gitman, Israel. "How Good Is Your Network Routing Protocol?" *Data Communications* 13(May 1984):231-48.

21. ZORK I, II, III. s.l.: Produced by Infocom, n.d.

22. MovieMaker. Reston, Va.: Reston Software, 1984.

23. Miller, Inabeth. "How Schools Become Computer Literate." *Popular Computing Guide To Computers In Education* 3(Oct. 1984):22-28. This is particularly useful for the questions raised on software evaluation.

24. Glossbrenner, Alfred. *How To Buy Software*. New York: St. Martin's Press, 1984.

25. Turner, Judith Axler. "Assessing Academic Computer Software." *The Chronicle of Higher Education* 29(5 Sept. 1984):26.

26. ROCKY'S BOOTS. Portola Valley, Calif.: The Learning Co., 1982; and PINBALL CONSTRUCTION SET. s.l., Electronic Arts, n.d. In addition, a new program entitled ROBOT ODYSSEY I. (Menlo Park, Calif.: The Learning Co., 1984) may prove quite useful in examining the nature of creativity in computer games.

27. Landa, Ruth K. *Creating Courseware*. New York: Harper & Row, 1984 is a rather interesting example of educational design tools that lead to software development.

28. Hammer, Carl. "Telecommunications and Network Trends." *T.H.E. Journal* 11(May 1984):100-04.

29. An easy-to-read article on licensing appeared in: Kern, Chris. "Preventing Program Piracy." *American Way* 17(Sept. 1984):167-70.

30. It is important to recognize that a number of journals that provide excellent reviews and analyses of software as well as directions in the computing field are not what we would include in the traditional lists of library journals. It is essential that librarians read such journals of the microcomputer field such as *BYTE*, *Popular Computing*, *Datamation*, *Computing Teacher*, *Electronic Learning*, *Creative Computing* and any of the journals of a specific computer and its software.

31. EPIE offers a wide range of reports and rather elaborate evaluation systems. On the other hand, *Electronic Learning* offers a simple set of forms to be used in evaluation (see *Electronic Learning* Nov./Dec. 1983).

32. It makes use of site licensing and offers alternative programs to teachers and thus to students.

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33. This series provides an exciting and innovative approach to learning popular software applications, computer languages and concepts, involving many of the industry's leading software developers and publishers.

34. The survey was completed in Aug./Sept. 1984.

35. EPIE (Educational Products Information Exchange) "gathers and disseminates descriptive and analytical information, along with empirical information on performance and effects on learners—about instructional materials, equipment and systems."

36. Softbanc Seminars, with Alan Greene (which provided seminars on the use of dBase II and LOTUS 1-2-3), has declared bankruptcy (see "News Note" in *Computer Living: New York* 1[Oct. 1984]:2).

37. A significant article on training, including an evaluation of offerings for training, appears in: Horwitt, Elisabeth, and Li, Lindsay. "Back to Basics." *Business Computer Systems* 3(May 1984):44-68+.