

Training in computer applications and on-line search for students of library science: a case-study*

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This article underlines the need for adequate training in computer applications and on-line search in library science courses in developing countries. It discusses the factors that present a challenge to such training and elaborates on the approaches and strategies adopted in the Postgraduate Training Course for Science Information Specialists in South-East Asia at the University of the Philippines. Given the particular characteristics of the participants in the course, it is necessary to provide an integrated programme such that they perceive computer applications as a necessary and helpful aspect of information services, and also to facilitate use of appropriate elements from the different modules of the course in the teaching/learning of computer applications and on-line searching. The advantage of the integrated use of lectures, demonstrations, seminars, practice and project work supported by course materials and audio-visual aids (transparencies, audio-cassettes, slides, tapeslides, kits, video tapes, films) and computer simulation packages in the training is presented.

Introduction

The need for training in on-line searching

Computer-based interactive information systems and on-line searching will continue to be used by an increasingly larger number of institutions and individuals. The growing number of information source files in machine-readable form (data bases) covering a wide range of fields, the possibility of frequent updating of data bases, powerful time-sharing computers, interactive user-friendly systems and transportable software packages, rapid-access storage devices and a steady decline in the cost of data storage, availability of portable and less expensive intelligent terminals and the development of good telecommunication networks have all contributed to the enhancement of on-line capabilities and the increasing use of on-line access to information. Developments in the field of microprocessor technology make it possible even for smaller institutions to develop computer-assisted information handling facilities and on-line access to data bases.¹ Therefore training in the application of computers and associated technology and software in library and information processing is important in enabling institutions and individual users to derive significant benefits from these developments in information handling. Library and information science courses thus include modules on information processing by computer. On-line searching is an important facet of such training modules.

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Integrated and intensive training needed

In an on-line search the user generally sits at a computer terminal in the library, office, laboratory or home and connects the terminal through a local telephone, coupler or modem with a computer in some other location. Using a password he or she gains access to the host computer and requests access to the particular system and data base of interest. The interaction language of the system, designed for use by persons without computer programming background, permits them to retrieve and display specified records or information and, in some cases, to do statistical and graphical manipulations and other types of processing.

An on-line search may be on machine-readable data bases created by an institution and accessible on a computer located in the same building or in some other location, or it may involve the use of international telecommunication networks such as TYMNET and TELENET, for accessing data bases and systems which are remotely located, or even at global distances.

The system user may be a library professional attempting to find references or information in response to a customer's query or it may be the inquirer directly attempting on-line search. Therefore students of library and information science may subsequently have different kinds of responsibilities as professionals in relation to on-line searching: (a) Carrying out effective and efficient on-line search for users; (b) Assisting, guiding and training users in on-line search; (c) Training others (library and information science personnel) in on-line searching in formal library or information science courses, in ad hoc courses or on-the-job.

Before going on-line on the terminal there are several steps and processes to be completed that may be independent of the on-line system to be used, for instance, analysis of the query to identify the specific information need, selection of appropriate search elements, etc. Conversion of the information need into a search expression acceptable to the computer is partly dependent on the system to be used.

Effective and efficient on-line search and retrieval require a knowledge of the characteristics of the data bases accessed, the conditions of access, the system commands, the interactive capabilities of the system, the type of output, and so on. It is therefore highly desirable that in library and information science courses the training in on-line search is integrated into the total course programme.

A comprehensive and at the same time intensive training, together with as much hands-on practice as possible in the use of on-line systems answering real-world queries, is needed to make the experience realistic and subsequently useful. Various papers and meetings have discussed the teaching of on-line searching as part of library and information science courses—the need for such training, the levels of training, the practices and problems, and so on. In a recent article, Guy and Large summarize the salient points and outline the practice followed at the College of Librarianship Wales.²

Further discussions in this paper relate specifically to the Postgraduate Training Course for Science Information Specialists in South-East Asia, hosted by the Institute of Library Science, University of the Philippines. This is an inter-country project of the UNDP with counterpart contributions from the National Science Development Board of the Philippines and Unesco as the executing agency. Details of the project have been presented elsewhere.³ However, it would be helpful to note some relevant features of the training programme to provide the contextual framework.

The training programme is intended: (a) to contribute to the development of

professional manpower thereby augmenting the science information handling capabilities in the libraries and information centres in the developing countries of the South-East Asian region; (b) to contribute to the training of teachers of library and information science; and (c) to develop training facilities and continuing education programmes in library and information science. The course modules, therefore, emphasize subjects that appear to need strengthening in the service centres and the library and information science schools of the region. Computer applications in library and information processing have been identified as one such area.

The objectives of the programme are achieved through a series of planned activities that include: (a) a full-time course in library and information science leading to a master's degree at the University of the Philippines; (b) a series of short courses, seminars and workshops in specialized areas to supplement the regular course mentioned under (a) and/or to serve as a continuing education facility for the information professionals of the developing countries of the region; (c) special ad hoc study and training arrangements on request; (d) preparation and arrangements for possible exchange and distribution of teaching aids, course materials, software, etc.; and (e) advisory service in library and information systems.

Influencing factors

Within the framework of the objectives and programme activities mentioned in the preceding section, three sets of factors in particular influence the approach to training in computer applications in library and information services (including on-line search). These are: (a) the importance of the integration of the computer applications module into the total course programme; (b) the special characteristics of the participants in the course; and (c) the need to minimize the cost of hands-on practice of on-line search.

Integration of computer applications studies into the course programme

The integration of the information technology module into the total course is to be such that: (a) the trainees from the developing countries of the region perceive computer applications as a necessary and useful aspect of information service; and (b) appropriate elements from the other modules of the course can be helpfully and efficiently utilized in teaching/learning computer applications to library and information processing activities.

In Table 1, Column 1 enumerates the modules of the regional science information course and Column 2 mentions examples of elements of each of the modules relevant or applicable to information technology, especially computer applications. In practice (see also the section on the restructured schedule below) it is an approach to achieving the objectives of integration mentioned above.

Utilizing appropriate concepts, techniques, models, procedures, etc., from the different course modules in the teaching/learning of computer applications to information handling prepares the participants better and leads them more 'comfortably' into accepting, learning about and practising computer applications. This smooth progression is of added importance given the special characteristics of the participants in the regional science information course.

TABLE 1. Computer applications of the course

Science information course module 1	Examples of elements of Column 1 relevant to computer applications/on-line system training 2
Information and society	Modern technology solutions to problems of access to information. Impact of computer on society and individuals, and on development. Cost/benefit issues, especially in relation to developing countries. User studies <i>vis-à-vis</i> computer applications.
Information systems planning and management	Planning and management theories and practices applied to computerized systems. Library automation and management issues. Managing change through information technology, etc. Standardization, resource-sharing, etc.
Organization of library/information source materials	Description and organization of information records for computerization; classification, coding, indexing, etc., in manual and computerized systems.
Information processing and handling	
Information services	Computer applications to current awareness, SDI, retrospective search, etc. Reference service on-line.
Information systems (electives) agricultural/industrial/development health information systems	Examples, models, design characteristics of computerized systems; networking, etc.
<i>Information technology I</i>	<i>(Core courses on computer systems, on-line search, system design, etc.)</i>
<i>Information technology II</i>	
Cognate courses: Communication Statistical methods Systems analysis and operations research Research methods	Relevant examples of computerized systems for application of concepts, methodology, etc., from the topics mentioned in col. 1.

Characteristics of participants

The characteristics of the participants in the science information course that need consideration in developing teaching/learning strategies and aids include the following: (a) the participants come from some ten developing countries of Asia and have different socio-cultural backgrounds, language competence, attitudes to the use of machines, etc.; (b) their work environment and work experience in library and information handling differ in kind, depth, etc.; (c) each participant has at least a university degree, but not all in the same subject-field; (d) their prior learning experiences differ and most of them are beginners in information technology; (e) there may be differences in some of these characteristics between the teachers and resource persons on the one hand and the participants on the other.

The teaching strategy and use of teaching aids need to be planned so as to minimize the difficulties in the learning process arising from the heterogeneous character of the participants.

Cost of direct on-line practice

Comprehensive and intensive training with adequate hands-on exercises on computerized systems (including on-line search) requires access to appropriate

facilities, expert guidance, etc. These are expensive. The Institute of Library Science, University of the Philippines, host to the science information course, does not possess computer facilities or on-line access to remote data bases. The Institute, therefore, uses such facilities in other institutions, mainly the National Computer Institute (NCI), five kilometres away, the Technology Resource Centre (TRC) at sixteen kilometres, and the Agricultural Resource Centre (ARC) at a distance of sixty kilometres. A microcomputer is now being installed at the Institute and several of the training packages will be implemented on it. The first three groups of trainees (1978/79, 1979/80, 1980/81) practised on-line access to remote data bases (SDC, Lockheed, etc.) directly on the terminal at TRC. This tends to be expensive and, the guide and participants being very conscious of the cost factor, this does not create an atmosphere conducive to learning by beginners.

Restructured schedule

Over the past year the teaching/learning of on-line searching has been restructured into a series of stages and modules providing for: (a) cumulative learning experi-

ence; (b) helpful integration of the computer applications module into the total course programme; (c) an intermodular approach; (d) integrated use of lectures, course materials, audio-visual aids, computer simulation of systems, etc., leading to productive hands-on experience of on-line searching at relatively low cost; and (e) a significant multiplier/synergistic effect.

Figure 1 illustrates the two main phases of the training programme on

System	Approach/ facility							
	Lectures with transparencies, manuals	Audio-cassettes, tapes	Demonstration	Practical guided exercise	Computer simulation	On-line practice	Detailed design and development	Project work
SDC	★	★	★	★	★	★		
LOCKHEED	★		★		★	★		
TIS	★		★					
CIS			★					
BLAISE	★				★			
COMPAIS	★	★	★	★		★	★	★
CDS/ISIS	★		★	●		●		
VIDOC	★		★	●		●		
PHILPAT	★		★	●		●		

FIG. 2. Approaches and facilities for teaching/learning on-line systems in the regional science information course.

on-line searching: (1) On-line systems (general) followed by (2) Specific on-line systems. Within the latter are two submodules—(A) on-line access via international telecommunication networks and (B) local on-line systems. The use of different methods (lectures, practice, project work) and of teaching aids (course materials and manuals, transparencies, audio-cassettes, slides, tapeslides, video tapes, and simulation packages) is also indicated.

Figure 3 indicates the approximate scheduling of the courses in information technology, Modules I and II, over two semesters and the other course modules the elements of which are prerequisite or used in the information technology modules (see also under 'Influencing factors' above) in general and on-line search in particular.

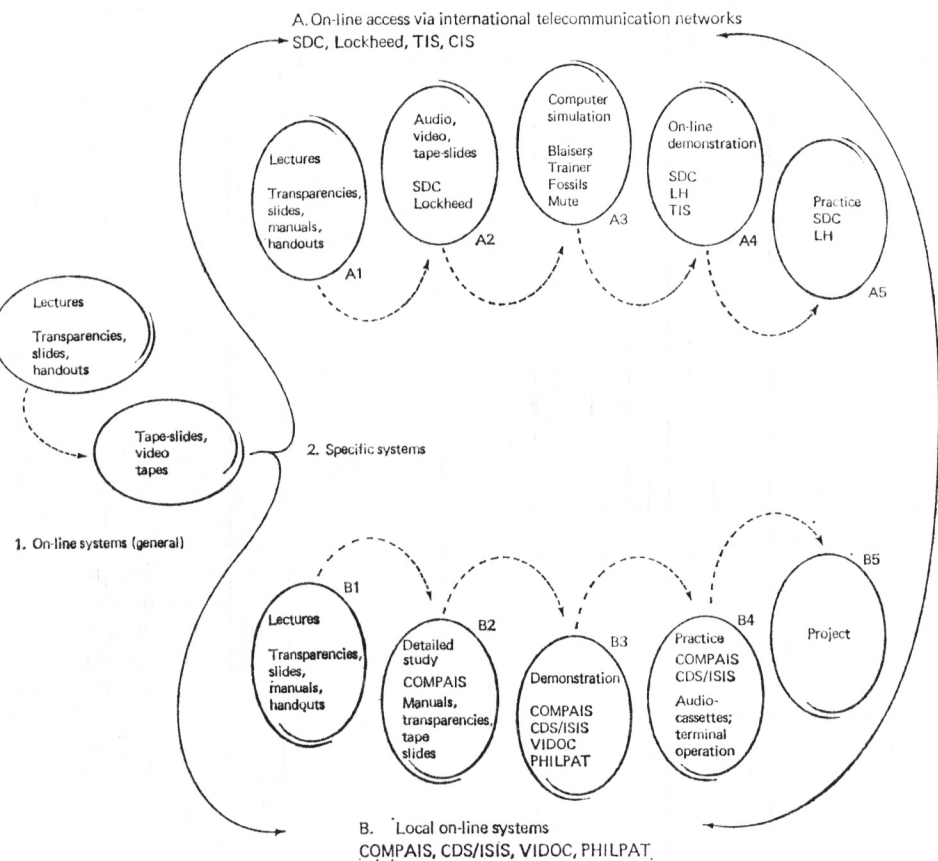


FIG. 1. Lectures to practice: on-line searching.

First term																	Second term																				
Courses	Description	Week															16	17	Courses	Description	Week															16	17
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1. Information services (30 h)	Computerized services: CAS, SDI, on-line references, etc.																																				
		2. Basics of electronic data processing, programming fundamentals and a programming language (BASIC, PL/1 or COBOL)	EDP		Programming fundamentals					Programming language					Case work																						
			Modern technology solutions to problems of access to information; computer impact; cost-benefit to developing countries																																		
			Information systems (concept, models, examples)																																		
			Planning theories, methods, applications, technology impact on library management										Planning project work																								
			Description of resource records; standards and codes, ISBD, ISSN, MARC																																		
Bibliometric studies in computerized systems																																					
3. On-line (Specific)	Systems analysis and design; data base management systems; telecommunication and networking; study of specific ISR systems and data bases; actual on-line searching	Systems analysis and design																																			
		Application: COMPAIS and subsystems										DBMS					Projects					Telecommunications and...															
		Local data bases					Foreign data bases					Basic searching techniques					Simulation		Demonstration of actual search																		
		Information systems: models, examples, etc.																																			
		Electives: subject/sectorial/mission-oriented systems																																			
		Classification and coding, indexing, vocabulary control, thesaurus design and use																																			
4. Information systems and electives (60 h)		Case-study of computerized systems																																			
		Media, computer and communication technology impact on human communication behaviour																																			
5. Information analysis and processing (31 h)		O.R. applications to computerized systems design																																			
6. Research methodology (31 h)																																					
7. Communication (30 h)																																					
8. Operations research (30 h)																																					

Fig. 3. Scheduling of curriculum.

Training for on-line search

Preparation within a broader framework

At the very start of the course in the first semester, the participants are exposed to various computer applications in everyday library and information work and services in the information-services module. The advantages and disadvantages of computerization in different socio-cultural and user environments are discussed in the information-and-society module. The management of automation and of the changes resulting from automation are considered in a review of system planning theories and practices in the information-systems-and-management module. Concepts of planning and models of global and national information systems, networks, etc., are also introduced as part of this module. The participants' knowledge of processing of records and information is reinforced through a study of the developments in document description, codes, guidelines and practices in the module on organization of library and information materials. Participants without a previous library science background take additional classes on basic information processing theory and practice to gain an understanding of the need and methods of identification of appropriate data elements

for a bibliographic record. Such knowledge also becomes helpful subsequently in constructing search statements for on-line inquiries.

The first information-technology module also taken in the first semester introduces the trainees to computers, EDP, programming fundamentals and programming languages (BASIC, PL/1 or COBOL). The course is conducted through lectures, case-studies and practical exercises, and is supported with transparencies, films and video tape presentations. On-line access to information sources discussed in the information-services module consists of presentations supported with appropriate handouts, transparencies, video tapes, etc. on the general aspects of data bases—their characteristics, producers, accessibility, on-line services, pricing policies, etc. Video tapes such as 'Where do we go from here?' and 'The Information cycle' and a tapeslide presentation such as the 'TECHNOBANK' (Technology Resource Centre) give a general idea of the different aspects of computerized information systems and on-line access to information. These are followed by a presentation of the on-line search process. Tape-slide kits such as 'On-line searching' (prepared by the College of Librarianship Wales), 'Using AGRIS' (FAO) and the video tape 'Information retrieval' by the Hafield Polytechnic are helpful in introducing search methodology, interactions with the user, terminal equipment, the output, etc. Trainees also get a first introduction to specific on-line systems such as SDC and Lockheed in some of these kits.

Specific systems

As in the first semester, elements from other course modules reinforce and assist in achieving a better understanding of computerization and computerized systems, but now in a more detailed study of the design, development and use of specific systems. For instance, specialized systems are considered in the information-systems module and indexing, vocabulary control, thesaurus construction, etc., are dealt with in the information-analysis-and-processing module.

The second information-technology module covers systems analysis and design; data-base management systems, file organization, telecommunications and networking; in-depth study of the design and development of computer-based information and retrieval systems and the application of computers to library operations. Instruction in on-line searching begins with lectures on basic search techniques: Boolean logic, query analysis and search strategy formulation. Exercises are done starting from a reference interview. The conversion of the analysed query into computer-acceptable instructions is demonstrated and practised for specific systems emphasizing the similarity between search strategy formulation and manual reference work, and the need to know and use the specific command language of each system. Sample on-line searches are illustrated.

As mentioned earlier and indicated in Figure 1, two distinctive submodules can be recognized: (A) on-line access via international telecommunication networks and (B) local on-line systems. Here again, the lectures, seminars and demonstrations are supported with appropriate handouts, manuals, transparencies, slides, etc., covering common features of such systems.

In the first submodule, teaching concentrates on systems that can be accessed from Manila, e.g. SDC and Lockheed. Such systems also produce training kits, manuals, tapeslides, video tapes, etc. Further, computer simulation packages of on-line systems are available and helpful in training, for example, BLAISERS, simulating the British Library Automated Information Service, FOSSILS simulating the DIALOG System, and MUTE simulating MEDLARS/MEDLINE (all produced by the School of Librarianship and Information Studies, University of Sheffield) and TRAINER simulating DIALOG and ORBIT (developed by Dr Elaine Caruzo of the University of Pittsburgh). These are written in high-level languages and can be implemented on small computers and microprocessors.

The course then goes into specific details of the steps in on-line searching of the SDC and Lockheed systems, e.g. query analysis, search strategy, formulation of search expressions, the system commands, etc., using appropriate manuals and guidelines. Students do several exercises and go through a 'dry run' of the search process. This is followed by guided practice of on-line searching of the SDC and Lockheed systems as a demonstration at the Technology Resource Centre (TRC). Then students practise using queries on subjects of likely interest to their respective organizations: they formulate search strategies and search expressions, and carry out on-line searches on the SDC and Lockheed systems on the TRC terminal.

During the past three years, a special short course on numerical data handling has been organized each year. On-line access to numerical data sources is a topic discussed and demonstrated during the sessions. During the last two courses a portable terminal (Texas Instrument Silent 700) was borrowed and telecommunication lines leased from ITT (local Globe-Mackay) for a few days, linked via TYMNET with the Technical Information System (TIS) of the Lawrence Livermore Laboratory, University of California, and through that centre or directly via TELENET with the Chemical Information Services (CIS)

(Washington, D.C.) and the National Bureau of Standards (Washington, D.C.) for interactive on-line searches from the classroom. Electronic mail and retrieval of information containing chemical structure diagrams, tabulated data, etc., were demonstrated through interactive on-line search exercises. In the data course organized recently (23 October to 6 November 1981), more elaborate and sophisticated on-line access to remote data bases was demonstrated. Using a HP2648A terminal linked via TELENET to the DOE/TIS at the Lawrence Livermore Laboratory, interactive electronic mail, chemical structure picture output, graphics, modelling, etc., were demonstrated. Through a telecommunication facility, a two-way interactive instructional session (tutorial) between participants in the course and a person at the terminal in the Lawrence Livermore Laboratory was conducted for about forty-five minutes. An electrochrome projector threw the output of the HP2648A VDU screen onto a large wall screen (12 × 12 feet) so that the participants could follow the transactions easily.

In the training on local on-line systems, the participants could use the following: COMPAIS, a computer-assisted on-line interactive system developed by the participants in the regional science information courses and the National Computer Institute; CDS/ISIS, the Integrated Set of Information Systems developed and provided to the Institute of Library Science, University of the Philippines, by Unesco (implemented on the IBM facility at the Agricultural Resource Centre in Los Baños); VIDOC (Vital Documents data base) and the Philippine Patents data base developed by and accessible at the Technology Resource Centre.

A series of lectures, demonstrations and limited exercises (by participants) are arranged with CDS/ISIS, VIDOC and PHILPAT, but COMPAIS is dealt with in depth and detail, including the design and development of the system. Complete documentation, manuals, tapeslides and self-instructional materials are available. Students perform exercises on the terminal and then work on projects based on the system, adding new capabilities, etc. For example, the last two groups of participants in the science information course added a circulation control system, a documents acquisition management system, a serials control system, union catalogue production, SDI, etc. These modules also have on-line interactive phases.⁴

Concluding remarks

Under the heading 'Characteristics of participants' above, mention was made of the trainees' attitude to the use of machines as an influencing factor. Two behavioural types are recognizable: the 'inhibited' and the 'aggressive'. The inhibited display a certain fear of the machine, are intimidated by it and hence become apprehensive when asked to do practical hands-on exercises. The aggressive display an attitude of 'it is only a machine' and attack it like an enemy to be beaten. In preparing the students to avoid their contracting either of these two attitudes, computer simulations are helpful in familiarizing them with the machine and the language of the system. Some students practise on ordinary typewriters to familiarize themselves with the computer or on-line terminal keyboard.

The training given in the two submodules—on-line access via telecommunication networks and local on-line systems—also contributes to learning about and practice of on-line searching. The participants are better able to do the exercises on on-line services such as the SDC and Lockheed systems and therefore the training in on-line searching is more satisfactory and relatively less expensive.

Notes

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3. A. Neclameghan and Ursula G. Picache, 'Postgraduate Training Course for Science Information Specialists in South-East Asia: a case study of co-operation in library and information manpower development', *Journal of Philippine librarianship*, No. 5, 1981, pp. 34-49.
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The Library of the School of Oriental L

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of the School
of Oriental Language

The Library of the School of Oriental Languages was reopened 2 November 1981, after reconstruction work of such importance that one new Library of Oriental Languages. This restructuring operation, carried out by the Direction des Bibliothèques, des Musées et de l'Information, was a major technique made it possible to overcome a very serious accommodation problem which had rapidly become acute and, finally, absolutely critical. The work became indispensable if the institution was to survive. This work was completed between 1978 and 1981, the old buildings being totally reconstructed and enlarged and made more functional. Before discussing this reconstruction, the author reviews the circumstances and his role in the creation and development of this institution.

Historical background

It may be of interest to recall that the historical origin of the library of the School of Oriental Languages goes back to Colbert to a certain extent. It was he, in fact, as a minister under Louis XIV, who in 1669 founded the École des Jeunes de Langues, a 'nursery' for interpreters, whose collections helped to constitute the library's nucleus. This nucleus, which followed by Arabic and classical Greek in 1721, was the first language taught in this school. This date marked the beginning of the school's history. The library was extended to 1762. In 1763, the school was attached to the Collège de France and Persian was added to the languages taught. Although the school was not the institution, an Order-in-Council of 30 March 1795 created the Collège de Langues Orientales, a parallel institution which was to teach Arabic, Turkish, the Tatar language of the Crimean, and Malay. The Order stated that the new school should be located in the vicinity of the Bibliothèque Nationale, and there it remained until 1869. Charles Schefer, the real founder of the library, born on 16 November 1816 in Paris, where he died on 3 March 1898, was at that time principal of the school. He succeeded in getting a decree passed (8 November 1869) which reconstituted the school and provided that the secretary should act as 'treasurer and librarian'. He then sought premises for the school and obtained them from the Minister of Education to have it transferred to the Collège de France. It soon acquired so many works that it became impossible to arrange for more space. In May 1873, Sedillot, the secretary, stated that they were in great difficulty when it comes to procuring books, manuscripts, or illustrations, and that the only solution is to move temporarily to 2 Rue de Lille until more suitable premises can be found.