Informational Data Bases for International Training and Human Resource Development

D.R. Minnick

Abstract

The author advances a strategy for informatin and technology transfer that uses computer information data bases formatted from enabling objectives and programmed instruction.

As the rate of knowledge discovery increases, there is a pressing need to find exped'tious methods to document and share relevant information and technology.

Technology and its associated information may be generated, but the technology transfer process begins with the training and development of human resources (HRD). The human component provides the expertise to evaluate and adapt the technology to the appropriate environmental, societal, and cultural conditions that prevail in a target population.

The transfer of information and technology with expedience and perpetuity in international training programs presents particular constraints such as:

- language translations,
- methods to assist in the documentation and updating of technological information
- courseware that must be adapted to a variety of literacy levels
- implementation of learner rather than teacher driven methodologies
- adaptation and transfer of training programs to meet in country needs in human resource development.

A strategy is advanced that addresses these needs by integrating the educational technologies of performance objectives and sequential programmed instruction into a computer data base. The integration of these educational technologies produces training or knowledge data bases that can be readily previewed, adapted and translated for in country training programs.

The Objective Component

Enabling objectives are an invaluable component to communicate the curriculum and information available in a courseware package. Within discipline topics they provide "windows" to, or a shorthand for, reviewing the content information of the topic. They enable course designers to perform the function of drawing inferences about the content information, without having to wade through the content information base itself. "Chunking"[1] the objectives further assists the user in grasping the content inferences. These objectives act as considerable time saving tool in scanning and compiling information for transfer into a training program. If there is doubt about the inference, the content data are accessible.

The Programmed Content Component

Although the objectives serve to provide a matrix that describes or defines the course curriculum, learners need the core content of information. Modular programmed instruction (PI) is a viable method of capturing and presenting content information. The tutorial style which uses a small step progressive disclosure. has been proven to facilitate inputting of information and enhance self-learning. Depending on the specificity desired, three to ten sequential frames are usually adequate to display the information encompassed by the related objective.

Pictures and graphics are invaluable aids in cross cultural information dissemination. They assist in defining and translating abstract concepts into a more tangible concrete reality. Subsequently, if used correctly, pictures in conjunction with simplified verbal sentences expedite overcoming language barriers. Highlighting vocabulary words/subsumers and extended glossaries are other techniques that enhance inputting and transfer of information.

The Computer Based Component

In the last decade, the microcomputer has become a viable tool to expedite storage and retrieval of technical information. In addition, it provides the means for instantaneous updating, editing, and translating information. The Hewlett Packard Asian Vectra is an example of upstream translation technology. More specifically, there are user-friendly shells of software that can be used to build and manipulate data for the purpose of customizing learning materials in both text and graphic communication. Dbase III, PC Pilot, PC Paint, Paintbrush and Tencore are examples in the compatible software lines.

Thus, both hardware and software are available to capture, document and manipulate information into most any desired format of verbal or graphic communication.

One prime advantage of using the computer for storage and manipulation of training data bases is the versatility of the medium. Computer-based information courseware can be generated on paper by using laser printers or transferred to slides using the available hardware technology. The printed materials can be used as a cost-effective adjunct to lecture materials, while the slides can be used as lecture aids or developed into slide-tape programs. The ultimate

Minnick is the training specialist and head, Training and Technology Transfer Department, International Rice Research Institute, P.O. Box 933, Manila, Philippines.

[1]Chunking is the process of producing a chunk. A chunk refers to a block of information that is coded in an abbreviated format and is usually supplemented by a performance objective to better define the contract. It is an educational term.

option is that of interactive computer aided-instruction (CAI).

Constructing Training Data Bases

Using these three technologies as a model for courseware development, a user smart, menu driven, software shell is advanced which consists of a series of interrelated data shells for storing and accessing information.

The size of each shell would vary, depending on the needs of the institution and the number of training programs it conducts. The first menu residing in the outer shell would be that of course offerings. Selection from this menu would lead to the second menu showing the disciplines or units prevalent in the course. Short training programs with narrow-focused information could omit this shell. Selection would expose a third menu listing the topics or lectures presented in a particular unit. The next or fourth layer of the database would consist of a menu listing the enabling objectives within a specific topic or "lecture." All objectives would be explicitly defined with a "chunk." And finally, the fifth menu which is the inside of the data base would contain specific frames that teach a particular enabling objective. These frames would be constructed in a linear program format, using progressive disclosure.

In summary, access to the content information that constitutes the primary information of the data base would look like this.

OUTER SHELL ----------	INNERMOST SHELL
SHELL LEVEL	INFORMATION
Menu 1 -----	Course Type
Menu 2 -----	Discipline
Menu 3 -----	Discipline Topic
Menu 4 -----	Topic Objectives (with chunk)
Menu 5 -----	Self Learning Frames (programmed format) (progressive disclosure)

Of course, all frames within a menu must be identified and catalogued. A call system would relate the frame to a counterpart in the next level of the hierarchy. A sixth menu (Menu 6) would be optional. This would contain feedback questions related to the content frames which would also be linked to a specific objective.

An example: A Third World country wants to develop human resources to utilize a new technology. The country has a critical mass of content experts in the field who could train additional experts through in country training programs. These resident experts have a grasp of the technology, and those components that are **applicable** to the country's specific population and conditions. The team of in country experts assesses the data base and, by scanning the information menu, selects those concepts applicable to their country. The team members then adapt the information to fit the in country clientele. Essentially, team members generate a training program containing a courseware package that is of THEIR design. The primary bases for the design of the curriculum are the enabling objectives with the information chunks. The self learning package is made up of the program frames attached to the objectives. To be cost efficient, the courseware can be printed from the computer base.

A Model

With the assistance of the International Development Research Center (IDRC) of Canada and the Hewlett Packard Corp., a model of the aforementioned training data bases is being developed at the International Rice Research Institute, Los Banos, Philippines. The software shells used in R&D consist of DBase III, Tencore, and Paintbrush.

Although there are much more powerful authoring programs available, these were rejected as development tools. The reason is that the educational technology design described in this article will ultimately be transferred to developing countries. Once translated, they should be caretakers and developers of their own information bases and courseware. The capabilities of these countries was a primary consideration, and in rejecting more powerful software programs in favor of the most cost effective.

The IRRI/IDRC model encompasses nine courses, fifteen disciplines, over four thousand objectives, and will contain an estimated three hundred thousand frames of information at completion. It is being piloted as a tool in HRD as part of a technology transfer strategy that involves course transfer in rice science to developing countries.

Summary

Computer data bases using a format of enabling objectives and modular program instruction are being advanced as an educational technology to capture, document, store, retrieve, update, adapt and translate training information. Use of such data bases are an innovative methodology to circumvent language barriers; develop and adapt courseware to specific cultural needs and circumstances; initiate teacher-independent training methodologies, and provide motivation by the principle of ownership and self-implementation of training programs in developing countries. For additional information, please contact the author.

References

Anderson, C. 1984. Agricultural Education Definitions and Implications in International Development. *NACTA J.* 28(2), 34-37.

Dwyer, Francis. 1972. A Guide for Improving Visualized Instruction. Learning Services, State College, Pennsylvania.

Mager, Robert F. 1962. *Preparing Instructional Objectives.* Fearon Publishing.

Minnick, D.R. 1985. Computers in Education: The Revolution. In Education for Agriculture. International Rice Research Institute, Manila, Philippines.

Munoz, Milton. 1986. Understanding Visual Literacy. *Bulletin 43,* Dept. of Agricultural Journalism, University of Wisconsin.

Niemiec, Richard P.; Blackwell, Madeline C.; and Walberg, Herbert J. 1986. CAI Can Be Doubly Effective. *Phi Delta Kappan.* 68(2), 750-751.

Simon, H.A. 1974. How Big is a Chunk. *Science* 183:482.