DOCUMENT RESUME

ED 396 732 IR 017 945

AUTHOR McAlpine, Iain
TITLE A Combined Video and CAL Package on Advanced Level Library Skills for Open Learning Students.
PUB DATE 96
NOTE 6p.; In: Learning Technologies: Prospects and Pathways. Selected papers from EdTech '96 Biennial Conference of the Australian Society for Educational Technology (Melbourne, Australia, July 7-10, 1996); see IR 017 931.
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; Foreign Countries; Higher Education; Instructional Materials; Library Catalogs; *Library Instruction; Library Skills; Material Development; *Online Searching; Open Education; *Search Strategies; *Student Research; Subject Index Terms; *Videotape Recordings
IDENTIFIERS Keywords; *University of Southern Queensland (Australia)

ABSTRACT

Advanced level keyword and subject searching of library catalogs and CD-ROMs is a skill that requires an effective strategic approach. In this project developed at the University of Southern Queensland (Australia), video and computer assisted learning (CAL) materials were developed that would model the search process, provide experience to the learner in the process of analysis, evaluation and reconceptualization critical to effective searching, and provide practical experience of the types of outcomes that may result from keyword searching. Key elements of instructional design and strategy that underpinned the design and development of the video and the CAL (computer assisted learning) package are: (1) information theory; (2) level of performance; (3) expert analysis; (4) knowledge type; and (5) situated learning. The first stage of the project concentrated on strategies for finding references that were known to the student and provides hands-on experience of all skills that the learner must be able to carry out. The second part of the project dealt with searching for information in situations where there is no reading or reference list provided. At this stage, users learn that there is no single correct answer, and that flexibility, a range of strategies, and appropriate evaluation of outcomes to meet the students' own individual interests and needs is the best approach to use when keyword searching. (Author/AEF)

A Combined Video and CAL Package on Advanced Level Library Skills for Open Learning Students

Iain McAlpine
Media Services
University of Southern Queensland
mcalpine@usq.edu.au

Advanced level keyword and subject searching of library catalogues and CD-ROMs is a skill that requires an effective strategic approach. The need to evaluate the outcome at every step, and to restructure the search strategy as a result of the evaluation of each step, means that the searcher must be able to think flexibly and to apply knowledge and experience to the task of searching. This task can be daunting to the novice, or even moderately experienced, searcher. In this project, video and computer assisted learning (CAL) materials were developed that would model the search process, and provide experience to the learner in the process of analysis, evaluation and reconceptualisation that are critical to effective searching, and provide practical experience of the types of outcomes that may result from keyword searching.

Context

The Open Learning Library Information Service (OLLIS) identified a need for education in library use for Open Learning students. This needed to be a comprehensive skill development program ranging from basic library skills to sophisticated keyword searches of library catalogues and CD-ROM indexes. Another important need was that the program had to be generic. User education classes are carried out in universities to familiarise their students with their own library. Open Learning students, however, have no 'home' institution so that instruction in library use has to apply to any university library.

The University of Southern Queensland was commissioned to develop a combined video and computer assisted learning (CAL) package to introduce students to library use. This was carried out by staff in the Distance Education Centre (DEC) and Library, to introduce students to library use. The package has been developed in two stages, a basic skills package and an advanced package. The introductory package, dealing with title and author searches, and the videotape component of the second package, has been completed and distributed to University libraries throughout Australia. The Advanced CAL program is undergoing the final stage of development (April 1996) and will be available in libraries this year.

Instructional design

Both stage 1 and stage 2 were developed by an instructional designer working with three librarians and a project officer as a close team. All key decisions were made in consultation with the whole team, and all outlines and scripts were reviewed by all members. The close-knit team was an important element in the design and development of the project.

Analysis

The desired outcome of the project materials is that a learner can flexibly carry out any type of search, either for specific items or information on a topic, on any catalogue or CD-ROM index. During the

content analysis, needs analysis, outline and development of an instructional strategy phases of the project a number of key elements of instructional design and strategy became apparent. These elements underpinned the design and development of the video and the CAL.

(1) Information theory

The need for the materials to be generic, rather than being anchored in any single catalogue system, led to the conclusion that the knowledge base needed by the learners is not how to use a catalogue or CD-ROM index, but information theory, *i.e.* the learner needs to know how to analyse information needs, identify the important information, and assess the potential relevance of information to a task. By focusing on this approach, the learners will be better able to understand what they are doing when they are searching a catalogue or CD-ROM. This led to an instructional approach in which catalogue or CD-ROM searching was preceded by a topic analysis, so that the learner has in mind the type of information needed, and not simply a procedure of using a particular catalogue system.

(2) Level of performance

A large number of key learning points were determined before the project began, however these did not all have the same level of importance. In a consideration of the relative value of specific areas of knowledge and skill a simplified version of Merrill's (1983) Performance Classification System was applied. The original classification rates required performance according to whether the learner needs to remember the information, or be able to apply it, or be able to find the information when it is not provided. Merrill also classifies material according to its nature; either facts, concepts, rules or principles. To carry out the initial analysis, learning points were classified according to whether the learner needed to know about the material (remember) or to do the task (apply the knowledge). 'Know about' or 'do' became a simple classification that had profound implications, as all concepts at the 'do' level are taught comprehensively, with hands on practice. This became the key determinant for the content of the CAL program.

(3) Expert analysis

The task of analysing topics to determine an information need, and searching a variety of catalogues or CD-ROM indexes to find sources of information is carried out regularly by expert librarians. In order to teach novice users to carry out this task, the performance of the experts was subjected to analysis, to determine the generic strategies that are used to find information. This was compared with the performance of novices, which outlined typical problems and set the parameters for an instructional strategy. This analysis involves cognitive modelling of expert performance (Taylor 1994) to determine cognitive processes and steps that may have become automatic and may no longer be apparent to the expert in the normal performance of the task. Having a team of librarians working with an instructional designer enabled the performance to be examined from different perspectives, which enabled all of the steps in the process, and the critical decision points, to be identified and a truly generic strategy to be developed (McAlpine, 1995). This process formed the basis of the instructional content.

(4) Knowledge type

An important issue in the development of this project is the type of knowledge and skill the learner requires. Knowledge and skill are typically considered to have certain elements of factual knowledge and component skills, described by Tennyson (1992) as declarative knowledge (knowing what), procedural knowledge (knowing how) and contextual knowledge (knowing why, when and where). This basic knowledge is overlaid by the application of strategies for management of information and problem solving. These strategies can be general executive type strategies, or strategies for dealing with domain specific tasks (Alexander & Judy 1988, Taylor 1994). Essentially, the skill to be learned in this project is the ability to operate at a strategic level within a knowledge domain (information analysis and searching). While the students need some declarative and procedural knowledge, this is minimal as the task of searching is not procedural. Procedural tasks are considered to become automatic with practice (Clark 1992), however the task of information searching cannot become automatic as the search may be reconceptualised many times according to the outcome at each stage. Using a catalogue or CD-ROM may become automatic, but not shaping a complex search for relevant information. This task does not usually follow any kind of algorithmic process. Instead, the results of

each stage in a search must be compared with the individual user's own concept of need, to determine, on an individual basis, in which direction the search must go. This task is inherently strategic. The challenge for these instructional materials was to develop the learners' awareness and competence to operate at a strategic level, with a minimal declarative and procedural knowledge base.

(5) Situated learning

One of the ongoing debates in teaching and learning is the extent to which instruction can take place in an abstract way, as opposed to learning in the real situation, or conditions as close to the real situation as possible. From the theoretical and practical position of the learner learning and 'expert' strategy to the greatest extent possible, it was seen to be desirable to situate the learning process in as real a context as possible to enable the learner to see and practice performance on task from the beginning. Hannafin (1992) presents this approach as a way of ensuring that instruction is not decontextualised, while Taylor (1994, p8) argues that: "The extent to which direct experience of tangible reality is necessary for the generation of an expert knowledge base is a key consideration in the design of instruction." A strong element of the instructional approach used in these instructional materials is to place every aspect of instruction within the context of a particular search, beginning with analysis of the information need, and following this through the search strategy. Using this approach, all instructional points are situated in a simulation of an authentic environment, with a minimum of abstract theory. This was a definitive consideration in the design of the instructional materials and the operation of the CAL program.

Development: Introductory level

The first stage of the project, 'Introducing Library Searching', concentrates on strategies for finding references that are known to the student, such as those provided on a reading list. As the desired outcome is to be able to find references on any catalogue, several catalogue systems are used as models on which the strategies are demonstrated, and on which the student can try out the strategies under guided conditions. The video covers all content knowledge required, beginning with how to select the right library, as Open Learning students may not necessarily begin by using a university library. Students are, of course, recommended to use a university library for all but short assignments. Students are shown how to analyse topics to select the most relevant references, and how to use catalogues for author and title searches. They are also shown how to consult librarians if their initial attempts at searching are not successful, and something of the range of other resources, such as reference collections and being able to consult the catalogue of another library to see if something is held there.

The first stage CAL program provides hands on practice of all skills that the learner must be able to carry out. These include topic analysis, selecting the appropriate references, and searching a range of catalogues for items by title and author. An aspect of the instructional approach is that the user is asked to perform the actions involved in the actual process, rather than answering questions. Thus a topic analysis asks the user to select the key words and phrases, and to select appropriate items involves pointing to the items on a list. Catalogue use is taught by demonstrating a system then asking the user to practice a search on the same system. The process is repeated on another system. As the desirable outcome is that the user can use an unfamiliar system, users are given examples of systems not previously encountered in the program to practice on. Guided feedback is given so that the learner cannot go far wrong in any practice search activity. By a process of emulation of the actual activities involved — selecting appropriate concepts and references and using catalogues — the learner is encouraged to think through and experience the process of information searching at the introductory level.

The strategic focus is on selecting appropriate references and adapting to different catalogue systems. Users learn the conditions under which they should search by author, by title or by subject, and therefore know the type of search they need to undertake. When confronted by different systems, the strategy they learn is to identify crucial instructions, or how to find instructions when these are not apparent on the screen. Menu systems are slightly more user friendly than command systems, however users must learn to cope with both, and to find the commands to use. Practice is given on different systems so that the underlying principles can be understood. In this way, a new and

unfamiliar system does not present an insurmountable obstacle. Preliminary evaluation data indicates that users can successfully search a previously unencountered library catalogue system after working through the program.

Development: Advanced level

This part of the project, 'Advanced Library Searching', deals with searching for information in situations where there is no reading or reference list provided, so that the student must search for unknown references on a topic. For this process the student needs to construct keyword and subject searches using catalogues and CD-ROM indexes. The emphasis on learning a strategic approach is even more critical in this stage as searches do not, in reality, lead to a single answer by finding a specific reference. Rather, different individuals searching on the same topic may find different outcomes, all of which may be effective in meeting the interests and needs of the individual searcher. Users need to learn that there is no single correct answer, and that flexibility, a range of strategies, and appropriate evaluation of outcomes to meet the student's own individual interest and need is the way to go when keyword searching.

The need for the users to learn flexibility led to a different approach to instruction. Instead of the users finally having to find references on an unfamiliar system, the users finally experience an extensive search for material, starting with a catalogue, and extending the same search on to a CD-ROM index. This is developed in a case study, in which the user can follow two hypothetical students, each searching for material on the same topic in a different library, and each finding different material that still meets their own need for materials on the topic.

Before reaching this point, users need to learn a range of strategies for dealing with the complex topic of keyword searching. These begin with advanced methods of topic analysis to identify suitable searchable keywords, natural combinations of keywords, and ways of identifying other words that may be used in combination, including synonyms or words that are related to the topic but are not part of the assignment. Selecting suitable words is taught at the beginning, however it is also through the experience of seeing these words used in searches that the user will learn to identify the topic words that are most likely to be suitable as keywords.

The same strategies users learn to find instructions for author and title search are used to find those for keyword and subject searches. This is only brief / dealt with, as the user should be more experienced by the time this program is undertaken. The key point that the user needs to learn is how to evaluate the outcome of a search. Are there too many references, or too few? Are these sufficiently up to date for the topic, and are they relevant to the assignment question? By dealing with these questions users are taught to assess outcomes, and to adjust their strategy as a result of this assessment. This is an important part of the process by which users are taught the think strategically about information, rather than simply finding a reference on a topic. A keyword search will usually find references, however these are not necessarily relevant to a particular assignment.

A keyword search needs to be continually adapted until a satisfactory outcome is attained. In accordance with their assessment of the outcome of a search, users learn to adapt their approach by either widening the search to encompass more items, or narrowing the search to find fewer, and more relevant items. The same approach is applied to CD-ROM indexes. Users are taught the different applications for words such as 'and' or 'or' and use of symbols such as the hash (#) to specify searches, however the strategy for keyword search, evaluation and subsequent modification is the same whether a catalogue or CD-ROM index is used.

Summary

Key elements of the analysis of instructional need are applied as fundamentals in the instructional methodology used in the project. By focusing on the search for information, as opposed to simply using a catalogue, the students learn to assess their needs. The use of the Merrill (1983) performance classification defined the content of the CAL programs, as both the introductory and the advanced program teach skills that the learner must be able to carry out in practice. The use of situated learning as a key teaching element led to the practice of teaching all skills under conditions that are as close as possible to the actual situation in which the learner needs to apply the skills. The identification of strategic thinking as the level at which an expert must function led to great emphasis being placed on

learning strategies in preference to factual or procedural information. From these it is hoped that the learner will be able to use a systematic and strategic approach to the complex task of locating information in libraries.

The project team

Instructional Design	**USQ Librarians**	**Programmers**	**OLLIS Librarians**
Iain McAlpine	Ilona Eberle	Allan Edwards	Marie-Therese Van Dyk
	Garry Hall	David Grant	Stephanie Cohen
	Jennifer Redding	Thea Russell	Debbie Leatham

References

Alexander, P.A. & Judy, J.E. (1988). The Interaction of Domain-Specific and Strategic Knowledge in Academic Performance. *Review of Educational Research,* Vol 58, No 4, pp375-404.

Clark, R.E. (1992). How the Cognitive Sciences are Shaping the Profession. In H.D. Stolovitch and E.D. Keeps (eds) *Handbook of Human Performance Technology*, Jossey-Bass, San Francisco.

Hannafin, M.J. (1994). Emerging Technologies, ISD, and learning Environments: Critical Perspectives. *ETR&D*, Vol 40, No 1 pp49-63.

McAlpine, I (1995) Developing a Generic Library Skills Multimedia Package Using and Expert Strategy for Instruction. J. M. Pearce & A Ellis (eds) *Learning with Technology: ASCILITE '95 Conference Proceedings,* The Science Multimedia Teaching Unit, University of Melbourne.

Merrill, M.D. (1983). Component Display Theory. In C. M. Reigeluth (Ed) *Instructional Design Theories and Models: An Overview of Their Current Status.* Lawrence Erlbaum Associates, Hillsdale, New Jersey.

Taylor, J.C. (1994). Novex Analysis: A Cognitive Science Approach to Instructional Design. *Educational Technology* May-June. pp5-13

Tennyson, R.D. (1992) An Educational Learning Theory for Instructional Design. *Educational Technology* January, pp36-41.