TEACHER EDUCATION IN INFORMATION
SYSTEMS UTILIZATION (PREPARATION
DES PROFESSEURS POUR L'UTILIZA-
TION DES SYSTEMES D'INFORMATION)

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ABSTRACT

The University of Calgary Faculty of Education is
attempting to enable future teachers to cope with the
information revolution-explosion. Much of the
"Communication in the School" course is devoted to
those aspects of information science related to the
teaching-learning process, including: information
communication theory and models; the production and
use of non-print and print resources; and bilio-
mediagraphic and computer assisted instruction
systems utilization training. (La Faculté d'Educa-
tion de l'Université de Calgary essaie de préparer
les instituteurs de l'avenir à faire face à la
révolution et à l'explosion dans le domaine de
l'information. Une bonne partie du cours
"Communication dans les Ecoles" est consacré à
l'étude et à l'enseignement de divers aspects de la
science d'information dont la théorie et certains
modèles d'information-communication; la production
et l'usage de resources imprimées et non-imprimées;
l'utilization de systèmes pour l'enseignement
assisté par ordinateur et des systèmes pour l'en-
seignement assisté de bibliographies et de média-
graphies.)

TEACHER USE OF INFORMATION SYSTEMS

Just as good child health care is often said to begin in the pre-natal period, so too, the appropriate point for the proper inception of the educator is the moment when he begins his professional education. And what better nurture is there for the embryonic teacher than that which can not only assist in sustaining his growth during the gestation period, but can also provide him with a substantial basis for continued intellectual growth throughout his professional career - the ingestion of a modicum of information concerning how to cope with one crucial facet of the information revolution-explosion, namely, information about, and some skill in, information systems utilization?

The Faculty of Education at the University of Calgary has insti-tuted an academic year-long course for freshmen entitled "Communication in the School" comprised of four quarter or mini courses. In toto, well over a quarter of the entire course consists of content devoted to aspects of information science as they relate to the teaching-learning process. The general introductory sessions, for example, deal with such topics as information and communication theory and models. It is the "Media" quarter or "element" of the course, involving three hours per week for twelve weeks, which is the particular concern of this paper. Here it is that the principal effort is made to lay the foundation whereby future teachers will ultimately be converted into professionals with expertise in the use of manual and automated information storage and retrieval systems and computer assisted instruction systems as they pertain to educational communication. Herein are treated the various forms of enhancement of teacher-learner communication in which the media serve as producers, storers, retrievers, transmitters, or displayer-presenters of information.

It is particularly noteworthy that the quarter course under discussion here is officially designated as the "media" element. This designation was deliberately selected to be indicative of the fact that the substantive content to be treated includes not only the print media but also, and even more emphatically, the "audiovisual" media including such newer electronic mass media as cable television. This deliberate emphasis on the audiovisual domain is not given merely to redress the imbalance of treatment vis-à-vis print and non-print media commonly found in information and communication science studies, particularly informa-tion retrieval studies. It is based upon the notion, that for a variety of reasons, such materials are, by and in the large, under-used and often misused in formal educational processes, despite the fact that the number and variety of these materials designed for school use appear to be growing exponentially. The fact that this apparently contradictory situation persists, concurrently with the strong and pervasive audiovi-sual media orientation, if not saturation, of the current generation of students, prospective teachers, and experienced teachers in "out-of-school" situations, renders the task of implementing a change in these matters all the more imperative.

TEACHER USE OF INFORMATION SYSTEMS

Among the more significant factors resulting in the ineffective and/or infrequent use of audiovisual resources in education is the widespread lack of adequate information about tnese resources, both at the classroom level and the school instructional materials or resource center (library) level. Doubtless, too, the situation resulting from the relative paucity of available secondary-reference materials dealing with audiovisual materials is exacerbated by the lack of available tools for the selection of these non-print resources, or even agreed upon criteria for their selection. There is all too often a resultant dependence upon unreliable producers' or publishers' catalogs for media resource information. There thus exists a distinct "knowledge gap" about audiovisual sources of knowledge.

Attempts to meet these "mediagraphic control" needs have ranged from simple linear files in libraries to coordinate indexing systems of inverted files, and, recently, to automated systems based on computer programs operating on magnetic tape or disk storage of data bases. Such attempts, quite difficult at any level of sophistication, even in the case of the print media, are rendered exceedingly more so, and more costly too, in the case of multi-media and/or multi-dimensional resource formats. The latter strictures apply equally to the classification and to the storage and retrieval aspects of these media.* Moreover, the existing small number of successful automated attempts on the part of information services to meet these needs are still relatively little known to many teachers. Consequently, the media element is specifically designed to provide the student with a "head start" in terms of knowledgeability of secondary reference materials and information systems dealing with the increasingly important audiovisual media useful in education. It is first intended to inform him of the printed means whereby he can discover and discriminatingly select from the existing audiovisual media those items suited to his students and to his learning objectives: Knowing how to make use of citation indexes; being aware of special reviews, and of various computerized services, such as SDI (selective dissemination of information) services; being aware of alerting services;and knowing the extent to which these services may be obtained

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*The Task Force on Computerized Cataloging and Booking of Educational Media Report (Standards for Cataloging, Coding, and Scheduling Educational Media, Washington, D.C., Dept. of Audiovisual Instruction (NEA), 1968) provided the basis for film library storage and retrieval of information based on titles, subjects, and specific content codes, all of which are applicable to content which can be codified in terms of the words used in verbal communication. But where the content to be retrieved consists of the materials of non-verbal communication, of as yet undefined terms, of rapidly changing dynamic content, of a multi-dimensional nature, such as computerized dynamic holographic visual presentations, the task of codification and of selective retrieval still remains to be systematically attacked.

TEACHER USE OF INFORMATION SYSTEMS

automatically and inexpensively would presumably facilitate the critical selection of print and non-print materials used in the classroom. The element similarly seeks to prepare the student for the task of using such non-print reference materials and associated equipment as are currently available, for example, microform catalogs of audiovisual materials, and microform readers, again as tools to selectively retrieve information from both print and audiovisual sources.

Hopefully, then, the future teacher will be at least partially prepared not merely for the end of the "search among the multiple card catalogs and producers' or publishers' book catalogs and ye shall find" era but more importantly, for the nascent era of automated information technology, wherein he will doubtless live and work. Hopefully, too, the groundwork will have been laid for both a willingness and a capability on his part to render assistance in the finding of solutions, immediate and more long range, to the information retrieval problems with which he, as a teacher, will soon doubtless be confronted. Efforts are, further-more, exerted to have the prospective teacher become aware of the probability of the eventual existence and availability to him, his students, and the public at large, at home, in the school, and at places of business, of computer-based central data information storage facili-ties as well as information retrieval networks. The learning of the operation of teletype computer assisted instruction terminals is there-fore regarded as partial preparation for the anticipated expertise required in the functioning of the multi-media terminals by means of which the local, regional, national, and international retrieval networks will doubtless be accessed.

Other basic operational skills necessary for the effective use of the devices and tools of modern educational technology, not already noted above, are also imparted. Flowing from such training, it is hoped, will be the subsequent assured acceptance and efficacious use of both currently available and yet-to-be developed viable technological aids.

At the outset of the media element its objectives are made clear in a formal statement, a copy of which is provided to each student. A portion of that statement is summarized as follows:

At the conclusion of the media element the students are expected to be able to:

1) describe the "novel" aspects of the newer media which disting-uish them from information storers, retrievers, organizers, and carriers such as books and chalkboards;
2) discuss in an essay the potential repercussions of the acceptance of computer assisted instruction as a form of education, in terms of its effects on teachers, learners, and society;
3) describe how learning materials or resources may be used

TEACHER USE OF INFORMATION SYSTEMS

effectively by teachers to enhance student learning; and
4) describe the distinctive features of several indexes and
other secondary sources of media materials, print and non-
print, including those which involve microforms and/or
computer tapes.

The attempted actual attainment of these goals involves the
student as a participant rather than as an audience member in numerous
very specific activities, including the completion of certain assignments
and projects. These experiences are all designed to provide opportunities,
as extensive as possible within the prevailing time limits, to practice
and to analyze information-communication skills in situations which are
themselves as practical as is physically feasible.

Many of the information retrieval-type learning experiences
arranged for the prospective teacher involve activities which have their
locale within the Instructional Materials (or Resources) Center of the
Curriculum and Instruction Department. These activities are preceded
by an audiovisual tape-slide presentation-orientation session at which
printed hand-outs dealing with the Center and a related major information
retrieval assignment are distributed. Essentially, the assignment deals
not so much with the use of the facilities and tools commonly found in
information centers or libraries, such as standard encyclopedias and
periodical indexes, but rather, with special types of secondary informa-
tion sources which bring together print and non-print teaching-learning
curricular resource materials under subject or media format, or other
rubric, including indexes, directories, card or book catalogs, abstracts,
thesauri, descriptor lists, mediagraphies, and media review periodicals.

The student is expected to engage in individual and independent
effort and to use all of his own resources and ingenuity before approa-
ching the Center personnel for assistance. He must first select a
specific topic regularly treated in his intended subject-matter teaching
field and grade level. He then discovers how to make use of appropriate
secondary sources, so as to obtain the relevant mediagraphic and/or
bibliographic details concerning a given number of recent teaching and
learning resource materials dealing with the selected topic and grade
level.

The preceding assignment questions are so phrased as to involve
the finding of answers to Taube's (1956) three now classic types of
questions which a searcher might want to ask when seeking information
from an information system:

1) Index type question: "What 'documents' are available on the specific
topic in question?";
2) Content question: "What subjects (i.e., topics and sub-topics) are
covered in the extant 'documents'?"; and
3) Association question: "What other topics are relevant to the precise

TEACHER USE OF INFORMATION SYSTEMS

subject being searched?".

The would-be teacher here gains familiarity with such reference sources as the seven volume Westinghouse Learning Directory, a work based on a computerized information bank. It provides curriculum topic or unit-related information for immediate reference by the learner and/or teacher. It is at this point, too, that he is likely to first encounter the NICEM (acronum for National Information Center for Educational Media) Catalogs, each volume of which treats the resource material available in a particular non-print media format, such as the filmstrip format. The fact that neither of these works provides clues as to the quality of the items listed therein is one that it is intended the student will note. He must then find one appropriate non-print and one print item among the holdings of the Materials Center which are not in circulation and must preview and evaluate these two items. To that end his attention is drawn to particular articles in information sources which not merely list but also critically review the resource materials with which they deal. Hopefully, some of the evaluative criteria, implicit and explicit, found therein, "rub off" on the teacher trainee. As a result, he is expected to be able to answer such queries as: "Would the students of the given grade level understand the content?"; "Would they be likely to find it interesting?"; "Does the content appear to be accurate?"; "Is it well-produced?". He is additionally required to adduce evidence or reasons for his responses to these questions.

Special attention is given to the ERIC system of the U.S. Office of Education as an example of a particularly useful educational information system. Knowledgeability concerning ERIC offers the teacher-aspirant an opportunity to assess his own professional identification level. ERIC can do so because it provides the members of the teaching profession with one of the basic means for the fulfilment of their desires as professional people - to become involved in a process of continuous learning and to "keep-up" with the advancements in their field. ERIC at last makes available at moderate cost and with dispatch professional services in education matching those previously available primarily in scientific fields.

A hand-out entitled "What ERIC is about, what it does, and how it does it" is distributed to each student. Included in it is a note indicating that the main Library of the University has a microfiche copy of the complete text of virtually every "document" listed in the ERIC system, and that the student also has access, at minimal cost, to a computerized magnetic tape information retrieval service which utilizes ERIC "documents" as its data base. As the latter system is not as yet "on line", the student is advised that the system will be accessible to him only through human intermediaries in the form of the University's Information Services Division and through use of the specific search terms employed in the ERIC system.

TEACHER USE OF INFORMATION SYSTEMS

To prepare the future teacher for the possible advent of a world-wide, user-oriented, single source information system such as that already in embryonic existence in the form of UNISIST (the United Nations Scientific Information System) and/or an encyclopedic educational organism such as the projected Wellsian "World Brain", to which he, both as a teacher and as a citizen, would presumably have access, and, to have him also give serious consideration as to whether he should either lend his support to or engender opposition to such proposals, a major specific subjective open-ended question is included in the assignment. The question is worded as follows: "What potential for the classroom teacher do you see in ERIC as a model of an even broader and more inclusive educational information system?".

Apart from the Materials Center assignment, other forms of practical information retrieval experience are provided within the media element. In the case of mediated information sources, primary or secondary, user knowledge of the operation of currently widely used "hardware" items, such as film, filmstrip, and slide projectors, microform readers, audio and video tape recorders, record players, and teletype computer terminals, is imperative. Each student is accordingly provided with both a demonstration of and a hands-on experience in the operation of these devices. In addition, training in the oeration of random access, remotely controlled, and other more sophisticated equipment, such as multi-media programmers, is provided on an optional basis.

The media element as well as the other elements of the course are all undergoing more or less continuous revision on the basis of regular faculty and student evaluations. Close collaboration of faculty colleagues with prime responsibilities in the educational aspects of information science - the instructors in audiovisual media courses and those in school librarianship, together with the professional staff of the Materials Center - will doubtless result in further major modifications in the media element. Several innovations are either immanent or are being contemplated for future implementation. It is hoped, for example, that during the 1973-74 session the University of Calgary will be one of the first institutions to install the very sophisticated and very comprehensive on-line IBM information retrieval system "STAIRS" (an acronym for Storage and Information Retrieval System) and that our teacher trainees will be among the first to have an opportunity to familiarize themselves with it as potential users. Beyond that, it would seem desirable to provide our students with yet another form of training. Having, in due course, acquired the basics of media "software" production, it would be well if they could also learn how to input into the retrieval system information regarding their own newly-produced resources. By adding their informed efforts to those of their prospective colleagues, teacher education students will hopefully help themselves and their future profession to cope with the information revolution-explosion.

REFERENCE

TAUBE, M., 1956, Studies in Coordinate Indexing, v. 5, Belhesda, Md., Documentation Inc.