EXPERIENCES IN IMPLEMENTING A COMPUTERIZED VOCATIONAL INFORMATION SYSTEM IN ALBERTA*

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Abstract

A computerized vocational information system has recently been field tested in Alberta. This pilot project, called VISA (Vocational Information Service for Alberta), is the outcome of several months of consultation and cooperation with staff of the Ontario Ministry of Education's Student Guidance Information Service (SGIS).

The experiences of two people primarily responsible for the implementation of VISA in Alberta, on an experimental basis, may be of interest to professional counsellors in other provinces. Representatives of the governments of Ontario and Alberta are optimistic that the exchange of information in career guidance between the two provinces may lead to added benefits for their respective publics.

This paper traces the steps taken in Alberta to implement the SGIS system, describes the procedures, some of the pitfalls, and discusses the Vocational Information Service for Alberta in relation to other computer-based systems.

Résumé

Un système d'information sur les carrières, utilisant les ressources d'un ordinateur, vient d'être mis à l'essai récemment en Alberta. Ce projet pilote nommé VISA, Système d'information sur les carrières pour l'Alberta, est le résultat de plusieurs mois de consultation et de coopération avec le personnel du Service d'information de directives aux étudiants du Ministère de l'éducation de l'Ontario (SGIS).

L'expérience des deux personnes principalement responsables pour la mise en marche sur une base expérimentale du projet VISA en Alberta pourrait peut-être intéresser d'autres conseillers professionnels dans d'autres provinces. Les représentants des gouvernements de l'Ontario et de l'Alberta sont optimistes que l'échange d'information relative à l'orientation de carrières pourrait résulter en des bénéfices additionnels pour leurs publics respectifs.

Cette étude trace les démarches prises en Alberta afin de mettre en force le système SGIS. Elle décrit les procédés employés de même que certains dangers que présente l'utilisation de ce système. Enfin, on y discute le Service d'information sur les carrières pour l'Alberta par rapport à d'autres systèmes à base d'ordinateur.

Guidance without data is quackery. Yet all too often in the schools of today momentous educational decisions concerning the lives and future careers of students are made with a dearth of information. Even when information is at hand, one is apt to find that little or no effort has been made to organize it in a functional and useful manner.[1]

Introduction

The purpose of this paper is to provide counsellors active in the field, and those persons in senior administrative positions in guidance and counselling, with an overview of the experiences of two people involved in the implementation of

1Grossman, Alvin, "Computers for counseling and guidance". In J. W. Loughary Man-Machine Systems in Education. New York: Harper & Row, 1966, 168-185.

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a provincially-based computerized information service.

Our involvement is predicated on a belief that the most serious impediment to career decision-making is the absence of valid up-to-date information. In recent years the opportunities in post-secondary education have been increasing at a rapid rate. As well, advances in technology have resulted in an increase in the number of new careers and in the job requirements of established occupations. No one person, or agency, has been able to keep abreast of these new developments even though wise career decisions are directly related to the availability of such information.

The person most able to provide the public with current information about such important things as educational opportunities, admission requirements, trades and apprenticeship training programs, financial assistance programs and employment forecasts is the school or community counsellor. However, the counsellor's time is at a premium and few can afford the luxury of constantly researching and checking career information. As well, it should be noted that not all people have easy access to a qualified guidance counsellor. Regretably, the majority of our young adults, and even older more mature individuals, are forced to make important career decisions based on outdated information.

One solution to the problem is the automation of occupational and educational information. The writers reviewed existing operational systems such as Illinois' CVIS (Computerized Vocational Information System) and Ontario's SGIS (Student Guidance Information Service) at some length with a view to determining the most appropriate model for implementation in Alberta. It became clear that these and other computer-based guidance systems could do what no human counsellor was capable of doing: store, update, manipulate and retrieve vast amounts of career education data.

Ontario's SGIS

In February, 1974, shortly after a visit to CVIS and SGIS installations, arrangements were made between the Ontario Ministry of Education and Alberta Advanced Education and Manpower for the acquisition of the SGIS data base. The SGIS system was adopted for experimentation for a variety of reasons. First, its data base includes Canadian careers classified according to the CCDO (Canadian Classification and Dictionary of Occupations). Second, the system is designed to operate by either batch-processing, or by on-line terminals. Third, the system has a proven record of success in providing information about colleges, universities, and apprenticeship programs to Ontario secondary school students. And, finally, the sharing of information about post-secondary educational/training opportunities between the provinces of Alberta and Ontario by use of a common data base could provide the impetus for a national career information network.

From April to June, 1974, a preliminary test run was undertaken in Alberta using SGIS. Approximately 100 high school students from two Alberta high schools took part in this venture. This phase allowed us to observe users reaction to the batch system. Feedback from teachers, counsellors, and students was helpful and encouraging.

In April of that same year the Federal government agreed to a request by the Province of Alberta for provincial use of data assembled by the Department of Manpower and Immigration. The way was clear for the acquisition and installation of Ontario's SGIS system.

In July, 1974, with permission of the Ontario government and through the courtesy of officials from the Ontario Ministry of Education, SGIS was installed at the Alberta Provincial Government Data Centre. There appeared to be innumerable advantages to not building a similar system from scratch. Modifications and adaptations of a proven system seemed to be a logical step and it was agreed that programming changes, innovations, and improvements would be freely exchanged.

We have called our computerized information system VISA (Vocational Information Service for Alberta). VISA is currently being field tested with approximately 70 users. Fifty of the people registered on the system are high school students enrolled at a composite high school which is located approximately 20 miles west of Edmonton. The balance of those having access to VISA are professional counsellors working at various secondary and post-secondary institutions and other government agencies in Alberta. Future development and expansion of the data base is presently under review.

The status of VISA as it relates to other computer-based systems

Super (1970) identified four basic elements in his review of developments of computer-assisted counselling systems. These are: (1) guidance theory, (2) the data base system which organizes data and interaction to implement the theory, (3)

the software system and support materials, and (4) the hardware system used for storage, retrieval, and display. The writers will attempt to relate the computer-based system they have been working with to each of Super's elements under the following headings: theory, user access, computer resources (hardware and software), and data base.

Theory

As has been stated in our introductory comments, the parent model SGIS, and its offspring VISA, are systems which have been developed because of a belief that career choices will be improved by the provision of better information. This is, in essence, the application of modern technology to the Parsonian (1908) concept of vocational guidance: information about the world of work, about the individual, and true reasoning between these two sources of information. Super (1970) refers to this orientation as the pragmatic approach upon which "standard educational and vocational guidances practices are based," in contrast to the theory of developmental decision-making underlying systems such as Tiedeman's (1970) ISVD (Information System for Vocational Decisions) or the more recent SIGI (System of Interactive Guidance and Information) developed by Educational Testing Service, New Jersey.

The theoretical basis of ISVD and SIGI is similar. The emphasis with SIGI is not only on the content of decisions, but on the process of decision-making (Katz, 1969). SIGI is designed to allow students to examine their own values, explore options, and formulate and revive career plans. As well, it should be noted that another pair of the more widely known computerized systems, ECES (Educational and Career Exploration System) and CVIS (Computerized Vocational Information System) are programmed to do far more than disseminate information. CVIS and ECES store information about individual students — interest inventories, grades, general aptitude test scores — for use in comparing the user's personal profile with his tentative career choice (Minor, Meyers & Super, 1969; Harris, 1972; Foster, 1972).

In Canada, with the exception of the developmental work of Hallworth (1974) using a minicomputer, the only operational systems (SGIS and VISA) can not be said to be truly interactive. These latter systems, however, are dedicated towards the sophistication of the first phase of the three-step process identified by Parsons over six decades ago.

The authors are optimistic that, if implemented, VISA may well bring to the Alberta guidance and counselling scene that kind of educational intelligence which Grossman (1966) considered to be a necessary requisite to effective decision-making.

Almost all technological innovations have been viewed with some distrust by those closely allied with the educational profession. However, there is no fear of the VISA system, or for that matter any other system, displacing the counsellor. Given the present state of the art, we are not overly optimistic that any system will become sufficiently humanized so as to replicate the sensitivity of trained professionals. Additionally, there is some evidence to suggest (Melhus, 1971) that even the most advanced interactive counselling systems are not capable of functioning as effectively with students of lesser ability as are human counsellors. We concur with Super (1974) that the utilization of the electronic computer can free student service workers to do what they do best: counsel clients. Professionally trained guidance counsellors will still be required to analyze and interpret data, to deal with feelings aroused by the confrontation of facts, to help in the implementation of decisions reached, and to help in evaluating outcomes of action.

User Access

VISA permits users to access up-to-date information regarding careers and educational institutions. Currently, users simply fill in one of five different request forms, which are available from a counsellor registered with VISA. The user marks his choices with an "X" or by entering special codes obtained from a series of master lists and then leaves the request forms with the counsellor, who then mails the forms to the Alberta Government Data Centre. Twice per week, all forms are keyed to magnetic tape by keypunch operators. The forms are then forwarded for "batch processing" on an IBM 370/168 computing system. Information requested is then mailed back to the students on unlined, white, 8.5″ x 11″ paper.

Computer Resources

The current system, as provided by the Ontario Ministry of Education, is intended to run on an IBM 370 System. At this time VISA is operational on the Government of Alberta Data Centre's IBM 370/168 Computing System.

The computing requirements are as follows:

Storage

magnetic tapes

—the requirement is approximately 20 tapes (2400 ft.) with densities of 1600 and 6250 bpi. The tapes are required to process the VISA sub-systems and maintain adequate backup.

disk

—two IBM 2314 disk packs are required.

core

—the maximum requirement is 370,000 bytes of core storage. However most of the programs only require 162,000 bytes of storage.

Input/Output Devices

—3 tape drives

—2 direct access storage devices

—1 card reader, optionally with an optical mark read (OMR) capability

—1 printer

Operating System

—IMB 370 (OS)

Compilers and Assemblers

—PL/1, ANS COBAL, and ASSEMBLER/370

Data Base

The data base contains the following five categories: careers, institutions, courses and programs, trainings, and guidance related information.

The careers data base contains descriptions of approximately 6,700 careers. The descriptions are basically those obtained from the CCDO. The careers are organized into 22 major and 94 minor groups according to the type of work performed. Our initial experience with this data base indicates that new careers need to be added, particularly those that represent careers available in Alberta but not included in the CCDO.

The current institutions data base contains general information regarding all publicly supported, non-university, post-secondary institutions in Alberta. As well, all Ontario post-secondary institutions contained in SGIS are included in the data base. This represents a total of approximately 200 institutions. The data for each institution consist of information regarding location, history, enrollment, special programs and facilities, major divisions and programs, admission requirements, costs and financial aids, accommodation, student services, persons to contact and organizational structure.

For each institution in the data base, there is provision for specific information regarding faculties and departments. This includes the various course offerings required for training leading to specific careers.

The training information provides the link between educational institutions and careers. Generalized information regarding training for specific careers is included in this portion of the data base.

The guidance-related portion of the data base primarily provides Alberta-relevant descriptions regarding correspondence courses, job interview information, financial assistance, armed forces careers, apprenticeship information, and health careers.

Modifications to SGIS

After the initial trial session with SGIS in April - June, 1974, and subsequent experience during the implementation of VISA, changes were made to SGIS computer control programs to modify printed material provided to the user. In addition, the SGIS data base was substantially modified and updated. Some of the modifications are indicated below.

The information contained in VISA is built basically upon that of SGIS. However, major additions were made to the Institutions and Programs portions of the SGIS data base. This was done to reflect Alberta institutional descriptions, programs, courses, and related information.

As well, major revisions were made to the SGIS trainings data. This was necessary because the SGIS training data base was tied so closely to conditions in Ontario that direct comparison to what exists in Alberta was invalid in most cases. Modification of the trainings data required examination of all information to ensure that conditions in Alberta were accurately described. The apprenticeship data, for example, generally required substantial revision and update as trades regulations in Alberta were often found to be different from those in Ontario.

Although procedures for modifying the data base are relatively simple, the manual process used in following the linkages between frames of information in the data base was often tedius and time consuming. In the future, it is hoped that changes can be made by using "on-line" terminals rather than leafing through "mountains" of computer print-outs.

A number of formatting changes were made to the output returned to the user in response to requests forwarded to the VISA system. These

changes reflect differences with the returns mailed to students using SGIS. Changes were made to the printed output which made it more pleasing to the eye and easier to read. In addition a number of lines of heading data printed at the top of each SGIS page has been reduced to a single line in the VISA system. This makes it much easier to continue reading from page to page. The next change to be implemented will be that of converting the "upper case" data base to that of "upper/lower case."

Conclusion

We think that we have, in VISA, the beginnings of a system which can answer well to Holland's (1974) criticisms of vocational information/guidance systems. Based on the Ontario experience, this system will not, as Holland would be inclined to assume, be inordinately expensive to maintain, be impractical (it can serve many persons at a single time) nor would it require a large initial investment.

The only real question that needs to be asked is whether any province can afford not to supply its citizens, particularly its young adults, with the kind of information necessary to enable them to confidently choose future careers. If it is important for people to make intelligent career choices based on an understanding of the widest possible number of alternatives, the advantages and disadvantages of each option (i.e. investment of time, energy, resultant lifestyle, etc.) and if it is important for us to maximize the developments of our human resources, then the implementation of a computerized information service would be a priority. The question that really needs to be asked is 'what is the cost of not providing such information?'

Along with the development and implementation of a career information system, such as we have become involved with, comes a tremendous awareness of the need for professional educators, particularly counsellors, to cooperate in the provision of vocational/educational data. Each of us must assume some responsibility for acquiring and dispensing accurate information in an easily understood and manageable form. This is important. It is important because only when we have provided all of our citizenry with equal access to information will we have taken the first step towards the liberation of human potential.

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