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ABSTRACT

A major thesis is propounded: The acquisition of the vocational role in life can be considerably improved by further incorporating vocational education and development into liberal education. The work of Ashcraft on career development and curriculum and that of Crites on vocational maturation are cited and provide the backdrop against which the author lays out the Information System for Vocational Decisions (ISVD). This prototypic, computer-based system represents a deliberate effort to cultivate vocational maturation, i.e., to make it occur. ISVD is discussed in the following aspects: (1) its general framework; (2) its data bases; (3) its decision-making paradigm; (4) its computer routines; and (5) materials. The status and prospects of the system as of December, 1966 are elaborated. (TL)

INFORMATION SYSTEM FOR VOCATIONAL DECISIONS

Project Report No. 2

AN INFORMATION SYSTEM FOR VOCATIONAL DECISIONS (ISVD): CULTIVATING THE POSSIBILITY FOR CAREER THROUGH OPERATIONS

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Graduate School of Education
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December, 1966

AN INFORMATION SYSTEM FOR VOCATIONAL DECISIONS (ISVD):

CULTIVATING THE POSSIBILITY FOR CAREER THROUGH OPERATIONS[1]

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I. Thesis

(The acquisition of the vocational role in life can be considerably improved by further incorporating vocational education and development into liberal education.)

II. Background

A. Ashcraft - the case for career, in addition to the case for occupation.

B. Crites - delineated vocational maturation as it is, not as it might be.

C. ISVD - represents deliberate effort to cultivate vocational maturation; i.e., to make maturation occur.

III. The System

A. General framework

B. Data bases

C. Decision-making: the paradigm for choosing

D. Computer routines

E. Materials

F. Career: the maturation of personal responsibility through vocational development

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[1]Outline of paper read at Panel, "Significant Research Findings from Section 4(c) Projects" during the Annual Meeting, American Vocational Association, Denver, Colorado, 7 December 1966. Robert P. O'Hara is Executive Director of the System. Principal Investigators are Russell G. Davis, Allan B. Ellis, Wallace Fletcher, Edward Landy, David V. Tiedeman, and Michael J. Wilson.

AN INFORMATION SYSTEM FOR VOCATIONAL DECISIONS (ISVD): CULTIVATING THE POSSIBILITY FOR CAREER THROUGH OPERATIONS[1]

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Thesis

You vocational educators are indeed kind to let me join into your interests and work through my research. I congratulate you and the U. S. Office of Education who, through leaders such as Louis Bright, Alice Scates, David Bushnell, and Richard Otte, have in recent years brought the important and delicate matter of vocational education under more intense research consideration in order that the acquisition of the vocational role in life can be further improved.

I am grateful that I can participate through research at Harvard University in your aspirations for vocational education. I trust that Harvard University can both lend perspective to our common concerns in vocational education and attest to the importance of the enterprise itself. I also hope through my work under Section 4(c) of the Vocational Education Act of 1963 to underscore realization that the completion of vocational development is one of the ultimate liberalizing and humanizing experiences.

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I believe that vocational education is necessary in liberal education in order to cultivate completion of vocational development more avidly than now occurs. This is the thesis I shall develop further with you in my several minutes. I trust that I can appropriately convey my actual belief that clear understanding of the necessity and import of the vocational role in life constitutes a freeing, not a constraining experience. I say this because, in the course of my talk, it may surprise you to learn that I will attempt to use a computer-based Information System for Vocational Decisions to further vocational development. Despite public opinion that computers make decisions and thereby determine lives, I intend to assemble a System in which users can, and must, themselves make decisions and thereby experience both much widened opportunity and the expectation that they will become more capable and responsible for determining their own vocational destinies.

Background

Ashcraft related the concepts of career development and curriculum. He spoke of the facilitation of career development through general and vocational education. Ashcraft argued that occupation is a specific, not final nor full, experience within the career. This condition cannot be achieved within just the necessary limits of vocational education. Vocational education presently largely limits itself merely to the provision of skill in relation to a specific occupation. Commitment, albeit temporary I hope, is absolutely necessary for skillful practice of an occupation. However,

in order for career development to proceed, it is necessary both that the commitment to occupation first exist and that the decision about specific occupation later diffuse into a condition of tentativeness. Vocational education does not at the present time sufficiently modulate its emphasis on commitment by a simultaneous emphasis on tentativeness. This is a condition which the Information System for Vocational Decisions expects to alleviate in important ways. The aim of the System is to foster capacity for, and confidence in, career, not just occupation.

Crites outlined the process of vocational development as he presently knows it to exist.. Crites noted that vocational development occurs throughout several years of life. Furthermore, vocational development has several identifiable modes and processes of expression. These modes and processes of expression largely develop in relation to the tasks and choices of an educational and vocational nature which we make it possible for youth and young adults to experience.

Since Crites is studying vocational development as it exists, he deliberately avoids considering how it might be. The Information System for Vocational Decisions which I and my colleagues are assembling in prototypic form, will do the contrary, namely focus on vocational development as it might well be. In doing so, we will attempt to take advantage of Crites' studies of what vocational development now is and to cultivate the career concept which Ashcraft sketched. However, the specific dimensions of vocational development which we will be attempting to augment are:

1. the placing of occupation into vocational development

as but a single instance of vocational expression;

2. the offering of responsibility to students and workers for choice in education, work, leisure, and marriage;
3. the extension of opportunity for occupational choice and preparation down into the elementary grades and out into work until retirement; and
4. the provision of an explicit educational context within which students and workers can be made aware of the value of fantasy, imagination, and preconscious experience for maintaining some continuity in personality organization and career while permitting the incorporation into personality and career of discontinuity in educational and occupational opportunities.

The faith of the System will be that intuition disciplined by reason offers the chief "guiding" mechanism for us in our democracy.

The System

General Framework

The Information System for Vocational Decisions is deliberately named despite the fact that our connotations for its words are not presently entirely a matter of common parlance. The word "Information" is intended to connote the placing of facts/data into the context of use. This use of the word emphasizes our belief that facts/data require the context of use if they are to be conceived as information.

Students and workers are to be permitted to turn educational and occupational facts/data into information through the System. Thus

the user becomes an explicit part of our connotation of "System." Our connotation reflects our intention to offer the user complete responsibility in choice of educational and vocational goals. Although it is probably inevitable that the computer will be blamed for "error," we do not intend to let the users of our System enjoy the luxury of that impression without contest.

The possibility for user determination of data processing in the System will be provided by a time-shared (or time-sliced as some prefer) computer potential. User-computer interaction becomes possible in the time-shared mode of modern large-scale computers. In that time-shared mode, the user 1) can make direct input into the computer under guidance from its predetermined routines, 2) can direct the processing of this input and other stored facts/data, and 3) can determine somewhat the form and content of the output. As you know, the speed of modern computers makes all this possible as if there were no delay in the computer's access to the user. Actually there is delay but the trick in establishing the operating computer programs governing the System will be to minimize that delay for the several users who will be in interaction with the computer seemingly as if their interactions were simultaneous. To the extent that delay becomes a factor in our System, the System will not service the needs of the user when he is exploring. For exploration, the mood being simulated in the interaction must be that of browsing. For instance, we all know that the telephone line has to be without "busy" signal when we are calling a person while in a condition of doubt about necessity for our calling.

Our context for generation of information through user-computer interactions will be that of vocational decision. Vocational decisions require parcelling of time and effort by the user to the several areas of his living in which attention and activity are expected. Our System will foster thought in relation to time and effort allocation to four areas of living: education, occupation, military service, and family. These categories represent several important elements of society in which interdependent activity is expected. Our System will deliberately emphasize the necessity for interdependence, but through encouragement of the expression of independence. We hope thereby to help persons mature through the exercise of choice and the mastery of choice processes, but to find self expression within responsibility for societal condition.

Data Bases

The System will have a data base for each of four areas of living: occupation, education, military service, and family. Data in each base is to range from general to specific. In addition, data will attempt both schematically to represent the present and to outline the future for a decade or so, such outlining to be in small time increments. These specifications obligate the System both to deal with local job markets and to incorporate data on local job vacancies which will be helpful in placement suggestions. The specifications further obligate the System to deal with education in generality sufficient for liberal education and in specificity sufficient for both local use and immediate progress to the next

level in a sequence of subjects or to activity of laboratory, practice, or actual kinds.

The fifth data base in the System will contain student characteristics. This base will be in two parts. One part will deal with characteristics of students in general and will report on relationships of these characteristics with later choices and successes of those students. This base will be used both to suggest alternatives to users who need wider scope for consideration and to subject aspiration to the test of "reality" when the user is in a condition of clarification of a preferred alternative. The other part of the student characteristic data base will be the private educational and occupational history of the user as portrayed in his context of developing justification for his preferences and their pursuit and consequences.

Decision-making: The Paradigm for Choosing

Reflection upon the facts/data of the data bases under System expectation that facts/data will be used will be offered in a paradigm of vocational decision-making which I have fashioned with Robert O'Hara. The paradigm essentially conceives decision in relation 1) to the passage of time, and 2) to the undertaking of activity required to achieve what one elects to achieve. This conception permits division of the time interval into a period of anticipation and a period of accommodation. Anticipation occurs before the activities of a discontinuity become required; accommodation occurs after activity is required. Stages of exploration, crystallization,

choice, and clarification are distinguished within the period of anticipation. Stages of induction, reformation, and integration become possible within the period of accommodation. Distinctions among these stages will have to be a central part of the Monitor computer routine which I describe in the next subsection.

Computer Routines[1]

Computer routines and supporting materials will be fashioned to conform with expectation that this vocational decision paradigm both exists and can become explicit and useful to someone who practices its use. The paradigm will determine the computer routines which we will develop to permit access to each of the data bases and to provide data upon request. There will be three primary computer routines: REVIEW, EXPLORATION, and CLARIFICATION.

The REVIEW computer routine will permit call up and comparison of a prior statement about a then future event after both that expected future event has occurred and the user has provided indication of how his prior expectations were fulfilled before he sees his prior statement of those expectations. The procedure will expect a person to experience insight with regard to consistency, and inconsistency available during comparison, and to learn from such insight that his own intuition guides his activity. The intended outcome of REVIEW is that the user learn from his history.

The EXPLORATION computer routine will allow the person to rove through a data base as near randomly as possible. The routine will

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[1]The basis for this planned use is due to Allan B. Ellis.

encourage use of randomness largely at general levels to conserve time but will not forbid specific exploration when desired. Furthermore, routines will be developed to suggest alternatives on the basis of comparison of personal characteristics with established associations between such characteristics of others and their preferred alternatives. The intended outcome from this routine is 1) emergence of a set of alternatives, and 2) the bases on which the alternatives are preferred. We emphasize this latter point to increase awareness of the reasoning process that is actually involved in career development.

The CLARIFICATION computer routine will be available after specific alternatives are selected. CLARIFICATION will take the user into queries about the depth of his knowledge concerning the then favored alternatives and the understanding of future alternatives which are likely linked with present preferences. The outcome desired from CLARIFICATION will be the dispelling both of some doubt and of some ignorance concerning the next step in the progress of career which the person is evolving. Lessening of both doubt and ignorance is likely to increase the user's confidence in meeting the required activities of his next step.

In addition to the three primary computer routines, MONITOR will be available as the only secondary computer routine. MONITOR will essentially consist of the evaluations which we are able to concoct to determine existence of mastery of stages in the paradigm of vocational decision-making. For this reason, MONITOR must be able to play back into as well as over the computer inputs which the

person generates. There will be three essential aspects of MONITOR. The first aspect will be the actual procedure which we concoct and program the computer to provide. The second aspect will be the bases on which we have caused our judgments to operate among the data put in by the person during his interaction with the computer. The third aspect will be the basic computer routines themselves which the person will be taught to use if and when he desires to have them. This aspect will make it possible for the user to write his own monitoring bases to some extent and to have these monitoring procedures play among his material just as ours did originally. We hope through MONITOR to encourage mastery of the concept of feedback and to give practice and supervision in its application.

Materials

The computer routines will incorporate the vocational decision-making paradigm. We do not expect that the computer will itself be sufficient to mature fully the capacity and confidence for use of the decision-making paradigm. We will therefore design two other activities into the System. One of these activities will be the simulation of decision-making. Simulation will be available in 1) games, 2) booklets in which the concepts are taught, and 3) decision problems of a vocational nature which must be solved in interaction with the computer.

The second of our activities which we hope will further mature the use of the paradigm of vocational decision-making will be the actual provision of responsibility for work under laboratory and practice conditions. In laboratory and practice, reality can replace

imagination if there is intentful supervision of our users as they practice. This supervision will probably be of the same nature as that employed by counselors with our users as they are engaged in the simulated activities of vocational decision-making during user-computer interactions.

Our materials must be compatible with computer use and must contribute to education for vocational decision-making. We will attempt to make visual and typewritten inputs available to our users under direction from the computer. Oral input must be with either the direct aid of the counselor or after his later review of a tape recorder. On line,oral input is not yet available in modern computers.

We will attempt to make pictorial and word outputs available to our users as well as auditory outputs. The coordination of our input and output modes with the several modes of the decision-making paradigm will test our imaginations to the limits.

Career: The Maturation of Personal Responsibility through Vocational Development

I have so far attempted to show that the Information System for Vocational Decisions will expect choice and will cultivate the capacity for and confidence in choosing by giving users almost infinite possibility for the exercise of decision-making among data bases while simultaneously attempting to make the processes of decision-making both explicit and mastered. These are elements in vocational development which have previously neither been unified in this manner nor made available for practice in modes in which complexity is possible but time is not of the essence, at least not

the time of persons other than the person engaged in the exercise. The existence of the System will therefore be a first-time physical representation of the "outside" which the person must first learn to bring "inside" and then to act toward knowing that it is there but knowing that he need not be "driven" by it if he is the master of it.

In its totality the System will represent "reality" in its data bases, offer processes for working with facts/data through its primary computer routines, and provide practice for integration of a differentiated condition. The System will provide practice under supervision through 1) its secondary computer routines, 2) its simulation of decision-making, and 3) its personal supervision a) by a counselor of the person in interaction in the computer routine and b) by a vocational educator as the student user assumes real work responsibility in laboratory and practice work situations.

The person who through his life comes to master structure and process in this way and to come to a comfortable and integrated accommodation to both, has mastered the archetectonics of vocational development. He has both developed and been tutored in the capacity to consider his development and to engage in the thoughtful activity which puts the person into development. This is possible through vocational development in which the "myths" of "others" and "authorities" are available in machines but interactions with their pronouncements are encouraged in ways in which all are eventually disclosed as being only partial and never completely accurate. By offering the person opportunity to come in contact with the best of the known and to grow in realization that the best of the known is

still not Truth, it becomes gradually possible for him to realize his own possibilities and responsibilities in representing his desires and aspirations. Through the practice of aspiring in the System, the user first has a "crutch" for the expression and testing of aspiration. It remains for the supervisors of the System to make sure that the "crutch" is later abandoned but that return for data/facts is not denied when they can usefully contribute to later decisions.

I speak of a mature condition in vocational development which is only approximated, never fully attained in all regards with all decisions. However, through patience and practice, persons should be able to achieve more mastery of the processes required for thought in action than is presently the case.

Processes of thought in action mature slowly. This is why the System expects to span a range from elementary school to retirement.

Processes of thought in action require practice and feedback as well as the exercise of imagination. This is why the System starts in imagination but spans reality through simulation of reality and through supervision of activity in real condition.

You vocational educators have to recognize in your daily activities the need for reality as test for imagination. This is an important reason why the Information System must embrace vocational education. Since vocational education is a form of education in which reality enters into education, I personally think it is a shame to attempt to make vocational education more general. Instead, we should attempt to make vocational education more specific to the goal of role incorporation. The vocationalization of preference and activity

depends as much, if not more, on education for understanding of choosing and role acquisition than it does on training for occupational skills. Vocational educators would therefore do well first to insure that their colleagues in general education did not forget to train for relevant occupational skills through their "general" curriculum, and second to concentrate their own attention on the socialization processes which are involved in developing understanding in relation to the processes of choosing and role acquisition. Such priorities would 1) place a general goal into the specific interests of vocational educators, 2) make both general and vocational educators accountable for the specifics of vocational education, but 3) still leave vocational educators with an extremely important stake in education for career.

The System's Status and Prospects

The Information System for Vocational Decisions has formally existed only since 1 June 1966. Since that time we have 1) assembled necessary personnel, 2) worked out our location in a complex University, and in collaborations with the Newton, Massachusetts School Department, and the New England Education Data Systems, 3) delineated our need for computational equipment, and 4) started the construction of computer routines and materials. We have also necessarily worked through a plan for our next twelve months, all within the first three months of our own existence. The past six months have been busy ones. However, despite occasional disappointments, I remain firm in belief that our theory is still accurate and possible.

The System is supposed to have a working prototype available by 1 July 1969. During our thirty-seven month project, we intend to

bring the System through two generations of a prototype. The intention is to have practically complete and reasonably accurate specifications of an operating computer system for vocational decisions at the conclusion of the project. We will also have a working second generation prototype, of course.

Two roadblocks loom ahead. One block consists of the limitations of existing computational equipment itself. These limitations are in the small size and capability of most of the existing equipment, in the slow emergence and delivery of adequate equipment, and in the actual cost of adequate equipment in relation to our original estimates. The second roadblock is in Congressional action toward research in vocational education. The reduction of funds available during Fiscal Year 1967, under terms of the Vocational Education Act of 1963, may well bring about serious barrier to the possible conclusion of the Information System for Vocational Decisions.

Personally, I think it is a shame for the country not to move rapidly to completion of this Information System project. I trust that I have given you some sense of the possibility inherent in the Information System in these short remarks. Personally I think that the System's possibility for maturing understanding of the vocational role in living are considerable. I sincerely hope that you vocational educators will continue to lend your interest to the System.