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ABSTRACT

The five articles discuss the implementation of a computerized career guidance program in a four-year institution. This program, The System of Interactive Guidance Information (SIGI), is the focus of a co-operative filed study between Educational Testing Service and the Illinois State University Student Counseling Center (ISU SCC). The first article deals with the implementation of the SIGI system at the ISU SCC and the use of SIGI in academic courses and individual and group counseling. The second article descusses the ISU SCC's approach to counseling as it relates to the use of SIGI. The Center's belief in personal growth as an interactive process permits the use of SIGI as a self-help tool at varying levels for the students. The third article presents the development of SIGI's Prediction program as an attempt to help students evaluate their chances for success in academic majors at ISU. The fourth article explains the preparation of planning displays in SIGI, designed to coordinate information about majors and programs at ISU with occupations listed in SIGI. Academic advisors, counselors, and departmental chairpersons are given instructional manuals to assist students in the use of SIGI. The fifth article presents research on the effectiveness of SIGI, indicating that SIGI is effective over a time period of seven days to two weeks, and that students find SIGI to be helpful and interesting. (Author/HLM)

University Counseling Center

Computerized Career Guidance Program

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Paper presented at the annual meeting of the American Personnel and Guidance Association, Chicago, Illinois, April, 1976.

The History of a Program: A Case Study of SIGI

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The use of a diary or log is a familiar tool in understanding change in individual or group counseling. Perhaps developmental counseling programs also grow and change in ways that can be better understood through the use of a diary. With this understanding in mind, the highlights of a cooperative counseling program linking Illinois State University (ISU) with Educational Testing Service (ETS) will be traced over a period from 1972 to 1976. The System of Interactive Guidance Information (SIGI) and the many ramifications of its implementation at ISU are the focus of the diary. The story runs from the early plans of a new student counseling center (SCC) staff to the actualization of many of these plans. It is written in retrospect with reference to written correspondence and from the viewpoint of the SCC staff involved.

Year One: Doing Our Homework

In 1972, the SCC was commissioned by the Director of the Center, Neal Gamsky, to write a task force report. Its contents were to be the rationale for career development (CD) counseling services on campus, an inventory of the then existent resources for delivery of programs, and recommendations for optimal future changes in delivery of CD programs. The first "official" statement was then made about SIGI as a possible program at ISU.

> "The scope of information needs to be vastly increased and include the option for the student to retrieve information relating to abilities, values, and other personal variables along with information relating to the environment; i.e., 'the world of work'. An example of a possible system is cited in the Vocational Guidance Quarterly (Vol. 20, 1, 61-62). This system includes a programmed planning sequence, a method for integrating personal value systems with career information, and a module for prediction of success in various fields (Cochran, et al., 1972)."

The spirit of the report was to supply the best possible rationale for our program requests although we were not at all certain that our requests would ever be met by administration. Nonetheless, we began to generate interest in our own staff for SIGI and began initial contacts with ETS. After a brief phone conversation with Martin Katz, the Director of the SIGI program at ETS, he referred me to Arthur Kroll, the Director of Career Development Programs at ETS. Since the SIGI program was in its initial stages of field testing at a two year school at that time, (no four year institutions were being considered for field test) early contacts with Katz and Kroll were less than encouraging.

Year Two: Setting the Stage

Although the request and acceptance to explore SIGI were quite tentative on both of our parts, by February, 1973, Kroll was considering the possibility of hosting a visit for ISU staff to view a demonstration version of SIGI. In May the invitation was extended and I went to see SIGI and discussed the possibility of a four year college field site for SIGI at ISU. Kroll was sufficiently enough interested in our proposal and the ISU SCC to visit the campus later that summer. He viewed our new facilities, met with our enthusiastic counseling staff, the Dean of Undergraduate Instruction, and ISU's Legal Counsel. Following that meeting, the Director of the SCC met with the President of the University to discuss the possibility of budgetary support for the program. The net outcome of these visits and meetings was reciprocal statements of intention and mutual expectations from the two agencies. In November, 1972, Neal Gamsky wrote the following to ETS administrators:

> "Enclosed is the signed letter of agreement between Illinois State University and Educational Testing Service to cooperate in the development of a four year college version of the System of Interactive Guidance and Information (SIGI). We are now making final preparations for installation of the necessary equipment and the assignment and training of staff for this program. We are looking forward to the introduction of this program on our campus and believe it will make a significant contribution to our career development program at ISU."

Along with another training visit to ETS with David Hoffman, another SCC staff member, one other important event was recorded in 1973. Although we did not know it at the time, the Board of Regents (BOR) for the State of Illinois commissioned a committee to study the career services in regency institutions throughout the state. The outcome of this study was to be an extremely positive aid in gaining later support from the BOR for the SIGI program. The report committee was chaired by Samuel Baker, an administrative aid for the BOR, who coincidentally had background and expertise in counseling.

Year Three: Down to the Wire and Quiet Success

Although ETS and the ISU SCC and administration were supportive of the SIGI project the budget expenditures for the buying or leasing of the hardware and maintenance, (sums totaling to roughly $70,000) the final approval for the funds was in the hands of the BOR. Numerous cost estimates and proposals for the program were submitted to ISU administrators which were in turn relayed to the state level. The following statement appeared in the five year academic plan of the university in 1974.

> "The University's Student Counseling Service is cooperating with Educational Testing Service of New Jersey in the development of a computer system for providing to students vocational counseling based upon current job market information. The system has been developed for community colleges, but Illinois State is serving as the pilot institution for adapting the program to senior universities" (Pp. 32).

The following excerpts from a proposal to be submitted as part of the budget proposal to the BOR highlight the emphasis on student need and accountability.

> "The demand for this program can be documented on both a national and local basis. According to national statistics a high proportion of students in college change their educational/career plans at least once. National studies indicate that roughly half of the students changed their undergraduate major at least once. More recent and local studies specifically document the information deficits mentioned above (ISU Institutional Study Survey Report, No. 1, 1973). A large sample of ISU students rated "development of identity and sense of self confidence" as

> consistently a high learning priority but rated their progress toward that priority as relatively little. Likewise students rated "ability to select information relevant to problems - distinguishing reliable information and sources" as a relatively high priority. This difference between actual and preferred progress was one of the largest for 1972 freshmen and sophomore students. These findings support the assumptions related to informational deficits (information about self or self identity and sources of reliable objective information - "world of work") mentioned above.
>
> It is not feasible to deliver services efficiently on a one-to-one basis with large target populations. It is the aim of the program, then to use our current manpower most efficiently with the introduction of a technological adjunct. It is anticipated that our actual professional manpower commitments to the career/educational planning of students will remain roughly the same but that the quality and quantity of these services will be greatly increased (Cochran, 1974).

During the Spring of 1974, the SCC was involved with meetings with the ISU budget team, purchasing officers, and representatives from the hardware vendors for SIGI. As a result of the legal and financial negotiations, we were down to the wire and the final budget decisions by the BOR were about to be made.

Perhaps the most fortuitous event was the timing of the meeting with Sam Baker from the BOR. On April 17, 1974, he interviewed personnel related to the delivery of CD programs on the ISU campus. His positive impression of the ISU CD delivery system is reflected in the following report that later appeared in the minutes of the BOR.

> "On the whole, Illinois State is providing exemplary career services. The staff of the career development unit appears to be exciting and creative and have designed an impressive array of career counseling programs. The career groups are well-received outreach programs which tends to attract persons who would not otherwise be aware of the career services available. Cooperation between the counseling, placement, and advisement functions is considerable and increasing. And finally, implementation of the SIGI system promises to not only upgrade the information utilized in career decisions, but also to increase student usage and counseling/advisement/placement interaction. Career services at ISU are becoming more visible and, consequently, more frequently used."

These first hand positive impressions carried to the BOR were no doubt of powerful impact in the final stages of the decision.

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SCC were preparing for the final justification of the program.
ant Dean of Student Affairs, Jude Boyer, we had prepared our
ear at BOR meetings at the state capital. We were ready for
ound" and anticipated the BOR's meeting agenda and planned a
ropriate meeting in May, 1974.
ed out, our attendance at the meeting was unnecessary. The BOR
ding of the program prior to the actual scheduled meeting.
the details were not available to us, we understood that the
/ phone and funds for the program were approved in that way.
uccess--the exact date of the BOR's action was not recorded.
l for a more dramatic finish and the way it actually ended was
:. Nonetheless, we had the money approved to buy the SIGI con-
/e were now ready, after almost 2 years, to begin planning the
:ation of the program.
'e installation was completed at the end of the summer, 1974. The
event of the year was the first proposal for a college course
laboratory component of the course. This proposal was to
long series of proposals aimed at presenting a course in career
dergraduate curriculum.

1975: The Year of Visible Success

75 started slowly for the SIGI program but as the year progressed,
the program were beginning to be met. Although the hardware
complete (the mini-computer, printer, and terminal) the software
delayed by a program revision made on SIGI designed to
ple terminals. When this revision was complete the software
done by Bill Godwin of ETS. After a brief "shake down" period,
begin an actual pilot study with limited numbers of students.
ails and rationale of the pilot study will be presented in another

part of this presentation. Along with the data and experience gained from the pilot study, the study relieved much of the suspense related to SIGI. The pilot study showed that SIGI would work at a four year institution and that students at ISU liked SIGI.

During the summer of 1975 we continued our staff training efforts with SIGI and began to invite ISU administrators and department personnel to view the SIGI configuration. These demonstrations were culminated later in the year when ETS and ISU jointly presented regional workshops. The workshops drew participants from many two and four year institutions in Illinois and adjoining states. They were designed to acquaint counselors, administrators, and other student services personnel with the possibilities of the SIGI system.

Two other significant events in 1975 marked the visible success of the program. After a long series of meetings with the ISU University Studies Committee, an elective course in career choice was accepted in the curriculum. This course was first taught in the Fall of 1975 and proved to be a viable means to present SIGI in the context of an academic course. Students from the career choice class were invited to a workshop presented by ETS at the University of Northwestern on October 6, 1975. The outcome of this panel presentation by student consumers of the SIGI delivery system was extremely positive. The second significant event of the 1975 year was the completion of the prediction and planning programs that contained local data. Later in this presentation we will discuss the procedure for adapting SIGI to the four year institution. It is important to note here that the initial data gathering for the prediction and planning programs of SIGI was successful and the cooperative agreement between ETS and ISU was working well. By the end of the 1975 year SIGI was beyond the pilot and demonstration phase and was beginning to become one of the most visible and sought after programs in the SCC.

1976: Program Delivery and Expansion

Currently the programming of SIGI has become somewhat routine in the ISU SCC. We are now confident in SIGI's reliability as a powerful tool in career counseling and we are becoming knowledgeable at programming SIGI into the context of other more conventional counseling interventions. There is still; however, much to be done with the program. The prospectus of the program includes continued efforts toward expansion of program delivery and continued merging of SIGI with other program interventions.

Our initial goal for SIGI was to move to multiple terminals by the end of the first year of operations. Due to severe fiscal problems in the State of Illinois and consequently at ISU, we have been unable to go beyond our initial one terminal configuration. We anticipate the addition of two more terminals by the end of 1976 and plan to continue toward a goal of 8 to 16 terminals in the more distant future. SIGI's hardware configuration is designed to carry up to 16 terminals and for maximum efficiency of the system these terminals are necessary. Since SIGI has never been conceived as a "stand alone" service, continued communication will be necessary to orient personnel in the use of SIGI in the context of academic advisement and placement services. Continuing cross-agency consultation is anticipated as an integral part of expanding the SIGI system.

Likewise more sophisticated understanding and application of the SIGI system is anticipated within the SCC. More research will be done to understand the potentialities of SIGI in the context of group and individual counseling. We now have "respectable" data on both the effects of SIGI alone (the pilot study) and SIGI in the context of a class (Cochran, Hoffman, Warren & Strand, 1976).

What we anticipate is more controlled research comparing the effects of SIGI in the context of group and individual counseling. We look forward to presenting SIGI to larger numbers of students in the next few years and also to gathering more data on the impact of SIGI related to the decision making processes of students. Now that many of the technical, financial, legal, and political aspects of the program have been resolved, we look forward to more emphasis on the service and research dimensions of SIGI.

In some ways we are just now, after four years, beginning to devote our full attention to the dimensions of the program that were initially more interesting to us as "counseling psychologists"--direct service and research. We are now able to enjoy student reaction to SIGI and to more carefully study the ramifications of the program. The events in the history of the program illustrate some of the obstacles that were surmounted before we could come to this comfortable place.

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Paving The Way

S. David Hoffman

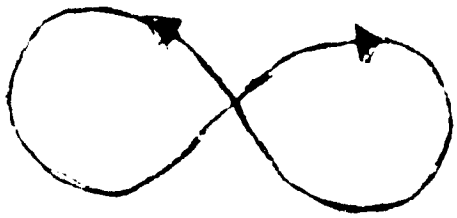
Illinois State University

In the ISU Student Counseling Center's Career Development Task Force Report (Cochran, et al., 1972), career development is described as: ". . . a dimension of general personal development involving the interaction of intellectual, emotional, social and physical aspects of the individual. This process results in a life-long interrelated series of decisions made actively and responsibly by the individual in relation to his environmental press." We have been aware, for some time, of the need to bridge the gap between theory and practice in career development. Consequently, at ISU we have been working toward building a comprehensive model which integrates theory and practice. Our program (within the total counseling center's programming) seeks to deliver direct and indirect services which are anchored in conceptualizations such as: implementation of self-concepts, values clarification, needs assessment, congruence of personality and environments, and self-awareness familiar in vocational and counseling psychology.

The proposed model of career development involves continuous, sequential steps in what Tiedeman & O'Hara (1963) call identity formation as it is forged in a process of choosing. In this developmental model we look at the "deciding-self" moving through time and society. Man is a social being, and the process of finding out who one is, and how one wants to be, occurs in relation to both internal and external states. Thus the decision-making process is characterized by the individual's awareness of and response to inner and outer cues. In facilitating this process, counseling is aimed at helping the individual clarify his inner world and environments.

Personal Growth As An Interactive Process

Personal growth is the progressive development of an individual's ability to become aware of and to respond to both inner and environmental needs or presses. Behavior represents the interaction between two hypothetical poles, inner and environment (Kroll, 1970). Individual and environment are engaged in a process, each contacting and effecting the other, which is characterized by differentiation and integration. Decision-making (choosing) skills are a key example of the operation of this dialectic and interactive process, and decision-making behaviors represent the linking element, the medium or "current" between the poles. The growing individual bases decision-making behavior in confluent movement between inner and environmental demands.



The deciding-self moves or negotiates between inner and outer support orientations. In Rotter's terms (1966) the support orientation of the "fully functioning" individual tends to fall between the extremes of inner/outer direction. The middle ground is found in discovering confidence in a life-style which is an expression of self and principles of living (Shostrum, 1966). An important enabling element in career development is a defined sense of identity which is based on internal consistency, inner support, self-awareness, realism in approach to the world, and decision-making adequacy of self-in-world.

If an individual develops ideally, then the confluent flow of awareness between the inner and outer poles procedes smoothly and with rhythm. This is what Piaget refers to as "mobile equilibrium." For this process to continue smoothly one must possess the potential to focus alternately on internal and external forces with ease. The development of greater sense of internality and

the ability to attend with confluence to internal and external information is the development of flexibility. An important outcome of behaving with flexibility is the clearer identification of what one wants and needs. This self-awareness is the first part of an "identification/integration/implementation process of decision-making.

We are not concerned with helping clients/students identify what "to be" in occupational terms as much as with helping them determine what they want from any occupation they might choose. That is, our services are directed (at various levels) at providing students with skills with which to process information they find or are given.

We are now working on defining two general styles or dynamics we see operating. Some students appear to be "undecided" while others are "indecisive." Undecided students may be described as those who are stuck in a specific decision, who need more or better information, or perhaps encouragement. They seem to have an understanding of the decision-making process which they have used in the past and are using in the present; and may be responding with "state-anxiety." Indecisive students may be described as those who always have difficulty with choosing, with even tentative commitment, self-support, etc.; and may be responding with trait-anxiety. The implications of this notion are important. Undecided students can probably profit from information regarding the object of their decision while indecisive students probably will not. Undecided students will deal with the decision in which they are stuck, and return to relatively smooth movement toward action; the indecisive student has difficulty approaching the decision, indeed the process of choosing.

This is related to purposes of using information in counseling. Issacson (1971) notes four:

> Motivational, teaching self-determination, the beginning of career planning.
>
> Instructional, which addresses itself to attitude change understanding of the d-m process, etc.

Adjustive, dealing with distortions of images about self and environment.

Distributive, dealing more with placement, action and use of information.

Dealing, in depth, with personal issues of indecision, anxiety, support orientation, values clarification, motivation and instruction are necessary with indecisive students as they have no (or at best ineffective) tools for processing information. At the same time this approach is not necessary with students who simply need information (distributive) to be assisted in a process in which they are already fairly effectively engaged.

We know from the literature and our own experience that program development, consultation, curriculur development and now computer assisted guidance (as a self-help technique) allow us to reach more students with appropriate levels of indirect service; and to create a high level of career development awareness on the campus. SIGI answers some questions for students, both environmental and intrapersonal. It teaches process of self-exploration as it is related to career development, that is personal decision-making about satisfaction/value priorities. Thus the computerized (self-help) guidance system serves a pivotal function in our programming efforts.

It is intimately related to our model in that it deals with valuing as a mediating force or basis of decision-making about curricular/career environments. It can be used in very effective ways with remedial, preventive and developmental target populations (Cochran, 1974) because as a system it delivers information that is motivational, instructional, adjustive and distributive. It is used in the curriculum as a laboratory experience in a course called "Career Choice," as an adjunct to individual and group counseling regarding career development, as an aid in consultation by requiring institutional specific information which necessitates contact between our staff and academic departments; and as an important catalyst for integration and in-service training between the SCC and partner Student Affairs agencies, Placement and Academic Advising.

The objective of Career Counseling services at ISU is to help growing college students develop the necessary skills to answer their "Who am I?" questions in such a way that they make meaningful use of information about themselves and their environments. SIGI, rather than being a computerized information delivery system, allows us to employ a self-help tool at varying levels with students to teach process, reinforce counseling gains, provide quality information quickly, and enhance relationship with other parts of the university community.

Following in this presentation are descriptions of some of the tasks involved in creating the local relevance of SIGI and our initial evaluative research projects with SIGI.

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"Tailor-Made" Computerized Guidance Program "A"

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Illinois State University

The first three programs on SIGI, Values, Locate, Compare, are prepared by Educational Testing Service and come ready for use. The fourth program, Prediction, requires the input of local information and necessitates staff time to complete it. This program helps students to judge their chances for success in various curricula at Illinois State University through the identification of a key course for each major, factors predicatory of success, and a grade distribution of past classes. So the information in the Prediction program is unique to ISU, building the program involved the co-operation of the academic departments on campus. Over a period of one and one-half years, staff members have contacted the 45 departments, some representing multiple majors, asking them to identify a key course for each major. A key course is one which differentiates those who do well in the major from those who do poorly. Out of several grade factors, two were identified by instructors as predicatory of success in the course. Examples of these grade factors are reading ability, writing ability, regular attendance, and manual dexterity. Students entering the course for the first time were asked to predict their future performance in terms of a letter grade, and these predictions were compared with their actual final grades at the end of the semester.

Working in the Prediction program on SIGI, students are first shown a GIGO frame (garbage in--garbage out) warning them against providing misleading information about themselves. After choosing a curriculum of interest with a key course, they evaluate themselves on several grade factors, including the two factors identified by the course instructors, and are shown a past grade distribution. Figure 1 depicts a typical frame in the Prediction program listing

grade factors and distribution. On the basis of this information, the students finally make an estimate of their probable grade in the course. The computer

Insert Figure 1 about here

calculates the probability of a grade of A or B, C, or below C for each student based on the best set of predictor variables (grade factors) collected in the interaction and reports the probability as "chances in 100" for receiving the various grades.

Students are given the chance to ask the meaning of "chances in 100." A series of frames using an archery analogy explains probability and the use of past experience to make predictions and attempts to transfer the prediction process from SIGI to future use.

An unpublished article by Norris and Cochran (1976) explores the validity of self-estimates (as part of non-test data) used as grade predictors. A comparison was made between non-test data and test data as college grade predictors using data gathered in the building of the Prediction program. Given the limitations of a small and diverse sample, the results still indicated strongly that non-test data were more valid predictors. For three of the four key courses, self-estimates had the highest or second highest correlation between predicted and final grade of the 17 non-test and test variables examined.

SIGI's Prediction program is an attempt to help students judge their chances for success in majors at ISU. Focusing on an informed self-estimate rather than a blind guess, it also familiarizes students with important steps in the prediction process: honest self-evaluation, identification of factors important for success, and a final judgment based on all information gathered.

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Figure 1

DEPICTION OF A TYPICAL PREDICTION FRAME

BIOLOGICAL SCIENCES: MICROBIOLOGY (BSC 260)

PAST PERFORMANCE: CLASS RANK: SECOND FIFTH ENGLISH GRADE: A
MATH GRADE: B NEED HELP WITH ENGLISH: NO

GRADE FACTORS:

	(1) ABOVE AVERAGE	(2) AVERAGE	(3) BELOW AVERAGE
INTEREST IN SUBJECT AREA		x	
COMMITMENT TO THE PROGRAM		x	
THIRD FACTOR		x	
FOURTH FACTOR	x		

PERCENTAGE OF STUDENTS RECEIVING VARIOUS GRADES

	grade	Percentage of students receiving grades
GROUP (1)	A, A, A-	xxxxx (10%)
GROUP (2)	B, B, B-	xxxxxxxxxx (19%)
GROUP (3)	C, C, C-	xxxxxxxxxxxxxxxxxxx (36%)
GROUP (4)	BELOW C-	xxxxxxxxxxx (23%)
	INCOMPL. W.	xxxxxx (12%)

WHICH GROUP (1-4) DO YOU THINK YOUR GRADE WILL BE IN? PRESS THAT NUMBER.

Tailor-Made Computerized Career Guidance Program "B"

Betty Green Rademacher

Illinois State University

In preparing the planning displays of the SIGI program, we considered first the philosophy of Illinois State University and the student services areas which use the SIGI system. The planning program gives information about majors and/or programs which provide adequate academic preparation for entry into the occupations in SIGI. Our goal was to construct program displays that allow a great deal of flexibility in semester scheduling. Consistent with the philosophy of allowing students freedom to make as many program decisions as possible, we selected the programs which allow for a maximum number of elective hours. Students may then use SIGI information to work with advisors in the Advisement Center or department to plan specialized programs which meet individual needs. When more than one major or program is considered to provide adequate preparation, all are listed. Students using SIGI at Illinois State University will find that the planning system also allows each student to select from a wide range of University Studies (ISU's general education category) approved courses and electives that support the major or major/minor combination. We also utilized ISU courses in terminal displays when that was appropriate. For example, the Occupation: Secretary in the SIGI system does not require a four-year degree, however, we reported appropriate ISU courses as well as listing junior and community colleges offering the Associate Degree in that field.

The actual preparation of the displays was detailed and time consuming. Conservatively 280 hours of senior staff time, 300 hours of research assistant's time, and 100 hours of secretarial time were spent in preparation of the planning system. Since this was the first time the system had been written for a four-year school, a lot of re-interpretation was required. The first task was to match ISU major programs to occupations. As we began to do that we found that

some majors provide direct entry to a given occupation.

Example:

Accounting Major	Occupation: Accountant
Elementary Education Major	Occupation: Teacher-Elementary

There are 37 of these matches among the 245 occupations. Appropriate multiple entries are available at ISU for many occupations and whenever possible this choice was offered to students.

Example:

Occupation: Market Researcher	Business Administration Major
	Economics Major
	Math Major

For 51 of the occupations there are majors at ISU that offer adequate entry although not direct.

Example:

Occupation: Hospital Administrator	Business Administration Major
	Medical Records Major

Medical Records is appropriate at ISU only because the curriculum includes courses in economics, business, organization and management, accounting, data processing and statistics, as well as medical terminology and other required Allied Health courses. In order to make wise decisions in matching the occupations and programs, one must examine carefully the courses in each program and in some cases even the content of these courses.

In gathering material to prepare the Special Displays for the occupations with a terminal classification, we matched individual freshman-sophomore (100 level) courses to the two-year programs. Many times only one or two appropriate courses are offered at ISU. We have records of all of these, but, in the final system, we used only those that offer the potential for a full semester's work at ISU. We researched and collected information on Illinois Junior and Community Colleges and technical schools for those occupations requiring only two years or less of academic preparation. Only nine occupations of the 245 in SIGI have no directly applicable course work at ISU.

We prepared an information sheet for each occupation including program, specific curriculum (course number and title) for ISU work, a list of junior and community colleges offering the program in the field, necessary high school prerequisites, and a list of follow-up (again in most cases Illinois schools) colleges if an advanced degree is required.

We then assigned a number to each separate and different program and special display. We prepared an index table and an index card for each separate display. We then wrote the information in the proper language and display form for programming and sent it to ETS.

Since academic advisors, counselors, and departmental chairpersons are physically separated from the SIGI system at ISU, it seemed helpful to prepare a manual for counselors containing all of the program material in the planning system. This is never to be used as a substitute for the SIGI planning system, but may be used in counseling to assist a post-SIGI student in considering a different occupation or in selecting alternate entry routes to an occupation. We find that it is also very valuable in revising and updating the planning system.

We are constantly concerned about adding new occupations. Students are giving feedback that says we need more four-year type occupations in the system. There is also an expressed need for more occupations that relate to the work environments that are more typical in the Midwest and Central Illinois. We are constantly in touch with College Deans and Departmental Chairpersons to be aware of curriculum changes and changes in major and minor requirements that need to be reflected in changes in the planning system.

Action Research

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Numerous research possibilities presented themselves with the installation of SIGI. Program planners were initially faced with deciding whether to undertake a simple descriptive study or a more complex experimental design. Several factors influenced the choice of an experimental design approximating that of an earlier study conducted by ETS at a two-year community college. First, because SIGI was new to the four year institution, counseling center staff members hoped to obtain data comparable to that gathered in the original field test. Second, considerable effort had been invested in the development of a conceptual framework encompassing all counseling center career development programs, including SIGI. Consequently, there was a desire to evaluate SIGI on dimensions relevant to the existing model. Third, staff resources were available in the form of eight student paraprofessionals already working with career development programs. Finally, there were considerations related to time. It was anticipated that at least three hours would be needed to ensure ample time for subjects to interact with the system's programs as they existed at the time of installation. In addition, there would be the time demanded of subjects for completion of pre- and post-measures. Practically speaking, there would be limitations to time available on the terminal and to the amount of time volunteer subjects would be willing to devote to the study.

The initial study was conducted in three two-week periods during the Spring semester of 1974-75. Subjects for the study were 72 student volunteers who had not yet declared academic majors. They were referred as possible participants by ISU's centralized academic advisement service. Forty-eight were randomly assigned to the treatment condition, 24 to a control/wait group.

Instruments used in the study were the Harren Vocational Decision-Making Checklist (Harren, 1966), the Rotter Locus of Control Scale (Rotter, 1966), a written occupational information test, an evaluation of SIGI, and a structured interview (Chapman, Norris & Katz, 1973).

The VDC measures an individual's level of development in terms of Tiedeman and O'Hara's (1963) theory of career decision-making. The Locus of Control Scale is a measure of internality versus externality. Both instruments were selected for their relationship to central concepts in the ISU center's model for career development services.

The written occupational information test asked the subject to answer questions about his or her first occupational choice. These questions were intended to assess the student's knowledge about the satisfactions which might be derived from an occupation, typical activities, working conditions and entry requirements. The SIGI evaluation form asked subjects to respond to how interesting, clear and helpful various parts of the program were. Other items elicited information about additional career counseling needs.

The structured interview was designed to assess subject acquisition of concepts concerning the career decision-making process taught by SIGI.

Subjects assigned to the treatment condition completed the VDC, the Locus of Control Scale and the occupational information test. They then had three scheduled sessions at the SIGI terminal. After interacting with the system they were interviewed by one of the student paraprofessionals using the standardized format. Interviews were audio taped for later coding of subject responses. Following the interview, subjects again completed the VDC, Locus of Control Scale and Occupational Information test. Treatment group subjects also completed the SIGI evaluation form at this time.

Control group subjects completed the same measures (exclusive of the SIGI evaluation form) at approximately the same points in the two-week period to which they were assigned as corresponding treatment group subjects.

No significant differences were found between subjects assigned to the different two-week periods. Analysis of the pre- and post-VDC scores suggests that SIGI is effective in enhancing decision-making processes relative to choice of major. No significant changes were found with respect to the internality-externality measure. VDC and Locus of Control Scale data are discussed in more detail in Cochran, Hoffman, Warren & Strand (1976).

Subject evaluations of SIGI as well as the relative ease with which we were able to recruit and retain participants suggest that students find the SIGI programs helpful and interesting.

Results of the structured interviews and the written information tests have not yet been tabulated and analyzed. This is due in part to the lack of staff time available to complete this portion of the study. In addition, there is some ambiguity in the interview material, due probably to the relatively small amount of time we were able to devote to training the interviewers.

As suggested above, the study indicates that SIGI is effective over a short period of time (ten days to two weeks), and that students experience the system as helpful and interesting. These findings have been supported by results of a longitudinal study involving a nine-week class in career decision-making featuring SIGI.

No systematic study has yet been undertaken comparing SIGI to individual counseling or examining the interactive effects of individual counseling and SIGI use. This has been due largely to lack of available terminal time and to administrative difficulties in carrying out such a study.

Many other specific questions might be addressed in future research, including SIGI's usefulness with various client populations within the university. In addition to these evaluative studies, the system lends itself to many other research possibilities. With its capacity to record user behavior at the terminal, the system's uses are almost unlimited in the study of career choice

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