

THE COMPUTER PARADIGM IN VOCATIONAL GUIDANCE

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Abstract

The technological advances in last decades have transformed the external resources of Vocational Counseling, Occupational Information and assessment of clients. Most computer systems follow a behaviorist-cognitive approach. However, the use of vocational counseling software is not exclusive to one conceptual approach. Computers are introduced in education from primary school; counselors and other educators are expected to use those systems. The attitude of counselors ranges from enthusiastic acceptance to complete refusal. Many counselors fear that computers will replace them. An underlying theory holds that counseling is based on the counselor-client interaction. A computer-client interaction cannot be considered vocational counseling.

Counseling has five basic aims: prevention, assistance, education and development, service of diverse groups and research. The most relevant trends in computer-based counseling are: tests and questionnaires based on computers, adaptive development, computerized information, vocational counseling systems and research. Basic aims and the potential role of computers in achieving them are discussed. Present vocational counselors can use the technology of computers to link the past of our profession to its promising future.

In view of these premises we have developed two computer systems that assist the vocational counseling process: "Professional Interests Questionnaire, Computer Version", and "Computer-based System of Vocational Counseling".

Introduction

The current social and economic changes have significantly modified the theory and practice of Vocational Guidance. At present, one of the main functions of this discipline is to contribute to find a solution to the problem young people face when –after having finished their studies or not– they try to access the labor market. The International Labor Organization (ILO) understands guidance as "... link between instruction and employment" (ILO, 1981). This perspective coincides with the guiding model for transition between educational institutions and the labor work (Bingham, 1986). This new paradigm gives more importance to the intervening factors external to the individual (Santander, 1988) than do the traditional models, incorporating sociological and economic vectors to the conceptual and technological framework of Educational Guidance, without disregarding the internal factors.

At the same time, the technological advances in the last decades have transformed the external resources of Vocational Guidance, Occupational Information and assessment of clients. Thus, the literary supports (books, magazines, brochures,

papers) are gradually set aside by audiovisual aids and computerized guides. The latter, in turn, have been developing from a passive format (similar to that of written books) to more complex interactive systems.

Computer Science has greatly changed our society and, undoubtedly, it is one of the most significant inventions of the century. It is important that counselors bear in mind the changes they should introduce in their services as the number of computers increases in the school environment.

Computer systems provide occupational and academic information and help in vocational decision-making. Most of the systems available in the market follow a behaviorist-cognitive approach and they are mainly concerned with vocational maturity and decision-making. However, the use of vocational guidance software is not exclusive to one conceptual approach, as counselors from any theoretical line may benefit from the information and psychological research computer resources provide.

Counselors' attitudes towards computers

The boom of computers in education is a fact and the degree of acceptance they have had shows that they are being increasingly used. Counselors' attitude ranges from enthusiastic acceptance to complete refusal. These negative attitudes have been called "computer phobia" (Jay, 1984) and "computer aversion" (Meier, 1985). In 1984, Walz pointed out that counseling had no connection whatsoever with the use of technology and this seems to be still the case a decade later, especially in our work environment. Such reactions have limited the efficiency of plans intended to implement the use of computers in vocational counseling situations.

Interventions aiming at increasing the efficiency, success and reinforcement of expectations may contribute to make the counselors feel less fear, apprehension and opposition towards computers. Changes in these negative attitudes should take place in the counselors experimenting them as well as in the environment where they carry out their professional activity. It is important that counselors begin to actively participate in the decisions concerning the orientation as regards the use of computers in their field of work.

Counselors should try and know something about computer science. Resistance would dwindle if an attempt is made so that all personnel likely to become users take part in the process planning and implementation. When planning the implementation of computerized systems, several factors should be considered in order to prevent negative reactions. Firstly, all members of the team should be actively involved in the process. Secondly, it is important to have the support of the authorities in the work environment. Finally, permanent communication between the counselors and the people responsible for the computer systems is essential to evaluate their efficiency.

Data confidentiality is another problem that sometimes arises. The rights and privacy of the system users should be protected; and it is at this point that counselors are responsible for developing ethic standards that should grant their appropriate use (Childers, 1985). Sampson & Pyle (1983) suggest some criteria to preserve confidentiality: a) to keep only essential data, b) data should be correct, c) data should be destroyed when no longer used, d) only competent people should have access to the data, e) data should be coded, f) no individual data should be used for research purposes without prior acceptance on the part of the subjects.

Computers are introduced in education from primary school. Counselors and teachers are expected to use these technologies; however, very frequently they are not given the required instruction to achieve this aim. Institutions and organizations should cooperate in the counselors' training to cope with computers. Such training should include global understanding of technical terminology, applications of this new technology, knowledge of how to operate computers and of the different languages and also of the different ways in which computer science may help to solve problems in the area (Wilmoth, 1983).

Many counselors are afraid of being replaced by these technologies and they ask themselves the following question: can a computer provide guidance? To answer this question it is necessary to consider the multiple activities involved in the guidance process.

If it is thought that the essential aspect of the process comprises only interview data, personal data, questionnaire and test results, provision of occupational and academic information, then the answer is "YES". However, if it is considered that apart from the information mentioned, the guidance core is the relationship counselor-client, the acceptance of clients on the part of the counselor, empathetic understanding, warmth, verbal and non-verbal sensitivity, then the answer is "NO". Computers and the tasks they carry out are designed to aid counselors and release them of routine activities such as questionnaire and test administration, profile elaboration, information dissemination. Therefore, they devote more time to interpersonal relations, as machines cannot capitalize on human qualities. Counselors should use them as auxiliary tools in their relation with clients, and consider them mere extensions of themselves.

An underlying theory is that guidance is based on counselor-client interaction. Interaction between the computer and the client cannot be considered guidance. Computers are not able to simulate counselors' qualities. They do not provide acceptance, make judgments, nor do they possess genuineness or spontaneity and their answers are programmed and stereotyped. They also lack the capacity to make decisions or share feelings, the way a counselor does. Counselors and computers serve clients by helping them to get information in order to make decisions. One of the responsibilities of future counselors will be to help their clients in the decision-making learning and not only in what

decisions to make. The counselor has an essential role in helping his clients to be more independent, more efficient and more responsible, which means that they do not only need to know how to collect information, but how to use it to make decisions about their vocational future project.

Objetives and tendencs in computer use

In order to determine the appropriate use of this technological innovation it is necessary to establish the relationship between computer use and guidance purposes or objectives. How efficient the use of computers in guidance situations may be depends on how coherent it is with the professional goals. Though guidance purposes continue developing, there are five basic objectives which are frequently included in the bibliography (Sampson, 1990): a) prevention (it involves help for individuals in order to prevent personal, social, educational and career planning problems), b) assistance (it helps individuals to solve personal, social, educational and career planning problems), c) education and development (it helps individuals to acquire knowledge and skills required to fully develop themselves), d) serve different populations (by making sure that the functions of prevention, assistance, education and development carried out by the counselors are available in the same way to different groups of people –primary, secondary, university students, graduates, adults, disabled people, etc.), e) research (generate and maintain a basic scientific knowledge to provide the aforementioned services to minority and majority groups).

The first three objectives have been widely developed by the American Psychological Association (1986) and by various authors. As regards the second objective (assistance) Fretz (1982) describes vocational guidance services, including evaluation and diagnostics as well as group and individual guidance and psychotherapy. Krumboltz, Becker-Haven and Burnet (1979) affirm that preventive guidance tends to reduce the frequency and severity of future problems by providing useful knowledge to that end. Ivey (1976) considers counselors as educational psychologists who guide subjects while providing them with a variety of resources that help them to acquire the required skills. Besides planning guidance services for different populations, vocational counselors should bear in mind the need to deal with people who demand a transcultural approach. The most common guidance research topic is the study of the equivalence of results obtained with Computer-Based Tests (C.B.T.) and conventional tests; data suggest that both kinds of tests are equivalent (Hofer & Green, 1985; Vansickle et al., 1989; Fekkman & Holden, 1989; Fogliatto, 1993). Despite the fact that this kind of research is very important, there are other research priorities related to the use of computers which should not be disregarded.

There are different tendencies as regards the use of computers; however, there are six which

are particularly relevant for guidance purposes: a) Computer-based tests and questionnaires, b) Instructions through computers, c) Adaptive developments, d) Computerized occupational information, e) Guidance expert systems and Computers in research.

The use of computers in the testing area has a promissory future, though there are still some problems. Test administration through computers allows to control the testing situation in a way which might have never been achieved with the pencil and paper traditional versions. Likewise, it gives the possibility of monitoring and informing about aspects such as latent states and response changes, which may be important predictive factors in themselves. Evaluation of tests through computers yields more reliable results; errors associated with manual evaluation are estimated to affect 10 per cent of the cases when correcting objective tests. These and other similar errors may have a greater impact on the score reliability than do some of the best analysis systems in the measurement theory. And what is more, computerized reports yield more consistent results that may be analyzed and improved if models and techniques suitable to that end are developed on a scientific basis. Finally, test scoring interpreted by computers may greatly contribute to measurement development in psychology.

Instructions through computers can be used to improve the disposition of subjects to answer to tests, questionnaires or structured interviews, as well as to integrate the data to the guiding process.

As regards skill or development tests, computers are extremely helpful in the so-called adaptive tests. In such cases, the item to be administered is selected on the basis of the previous answer, that is, not every student receives the same set of items. Two factors have contributed to make this development possible. In the first place, the "Item Response Theory" (IRT) (Hambleton & Swaminathan, 1985) providing the psychometric bases to calibrate an item bank within a determined area as from different sets of items, so that the marks obtained by different subjects may be represented in only one measurement scale. The second factor is the microcomputer itself, for it can very rapidly make the necessary calculations to select the "most important" item to be administered to a determined subject.

The adaptive developments are also designed to facilitate disabled subjects alternative ways of data input different from the traditional keyboard (by means of the word, simplified keyboards, Braille system, etc.). Thus, this population with special characteristics is able to complete tests with a minimum external help.

Computerized information systems provide helpful and accurate data given on time with reference to the academic characteristics and conditions of the labor market (Jacobson, 1981). The enormous amount of information both on instruction opportunities and employment that needs to be handled, as well as the growing complexity of the processing of said data, makes it a priority to develop and use the computer resources

that complement and improve to maximum the human resources in guidance.

The computer may be considered as the means to perform a correct choice. If computers have been able to solve highly risky problems, such as the landing on the Moon or a medical diagnosis, why then not the election of a course of studies? A computerized system requires precise and clear instructions. It is visible and easy to assess, but once again it is important to consider the restrictions inherent to these technologies. They can offer a great amount of data but they cannot replace the counselor. Computerized systems hold a lot of correct and updated information. People in the best guidance systems are helped not only to make decisions but also to learn about the process of decision making.

Computers are both tools and objects of investigation. They are tools as from the moment software can be developed which collects data on how they are used by individuals (Space, 1981). They can also record exact data as to: a) which software components are actually used by people; b) how long people take using the different components of the program; c) the answers of the clients. Gelso (1979) suggests that research on guidance is one of the most powerful strategies because of the combination of scientific accuracy and the inherent importance to this way of access. Research on guidance is relevant for the assessment of the efficiency of the five objectives previously mentioned.

Some counselors can be trained to develop software in some of the trends mentioned, this requires the learning of new skills. However, Chambers and Sprecher (1980) recommend the interdisciplinary approach, for the task of developing computer programs and systems demands team work made up by the joint efforts of an expert in contents, a designer of instructions and a programmer. In this particular situation, the counselor would be the expert in contents, and in some cases -highly desirable, in fact- the designer of instructions as well.

Having these premises as basis, we have developed two computerized systems to be used in processes of Vocational Guidance:

- a) *Computerized Questionnaire on Professional Interests (CIPC, its acronym in Spanish)* (Fogliatto, 1993)
- b) *Computerized Vocational Guidance System (SOK its acronym in Spanish)* (Fogliatto and Perez, 1997)

Computerized questionnaire on professional interests

In order to make up for the lack of psychometric tests designed in our environment in the area of guidance, the construction of the Questionnaire on Professional Interests (*CIP*, its acronym in Spanish) (Fogliatto, 1991) was carried out. In an experimental study, three different questionnaire forms were designed and, on the basis of results obtained, the final paper and ink version was elaborated. Items underwent a factor analysis in

order to identify the areas of interest; this leading to an organization of items into 15 descriptive scales (Humanistic, Computer, Biosanitary Interest, etc.). CIP is provided with tables for secondary school students and university students; validity and reliability studies have been carried out with highly satisfactory results. The questionnaire comes in a set made up by a Handbook, an Item Booklet, Answer Sheet, and Correction Tables.

A computerized version (CIPC) was elaborated having in mind the importance of interest measurement in guidance processes, the highly positive results observed in their assessment using CIP and the advantages in its administration and evaluation through microcomputers. A microcomputer administers and evaluates the questionnaire; two copies of the results are printed, one for the person receiving guidance and another for the counselor, who immediately gets a copy of the Interest Profile, the areas in which percentiles were higher and a list of the courses of study associated to them. CIPC comes in a set made up of Handbook and diskette. It can be operated from any XT or AT computer supporting DOS.

Computerized vocational guidance system

Once the Questionnaire on Professional Interest, Computerized version (CIPC) had been elaborated, it was incorporated as the first module of the Computerized Vocational Guidance System (SOVI). During the second step and based on a series of previous investigations on Job Information and Demand, a data bank was devised on Computerized Job Information apt to be used in guidance processes with students of the secondary school interested in entering the superior stage. The results obtained in this phase of the project gave birth to the second and third SOVI modules, providing information on university courses of study which lasted longer (IOC) and university as well tertiary courses of studies of shorter duration (IOCTER). Seven common items to every course of studies in the system served as starting point for the elaboration of the informative data bank of IOC and IOCTER modules, namely: 1) definition of course of studies and professional role; 2) main role activities; 3) related diplomas, places of study and number of years; 4) main subjects in the curriculum and additional information; 5) job field for graduates and perspectives of labor insertion; 6) necessary conditions for learning and role development (interests, skills); 7) complementary information sources on the course of studies and the role.

The Computerized Vocational Guidance System (SOVI) is a vocational assistance software. The program is designed to be used by students at the transition between secondary and tertiary levels within the educational system. Its use is recommended at two key moments in the process of guidance: the evaluation of interests and the provision of occupational information. The first function is carried out by the CIPC which -as

previously stated- allows the user to obtain his/her interests profile, the areas in which high marks have been obtained and the list of courses associated to them; the second, is a data bank presenting information on 160 university and tertiary educational options in the territory of Argentina. The program is set in three modules, the user may enter either any of them or all. It can be operated from any AT supporting DOS computer, and it is easily operated by adolescents. A second version for Windows is currently under way, which shall include an update of the data bank on occupational and academic information.

Conclusions

The use of computerized systems in guidance facilitates those consulting it their choice of course of studies. The use of technological improvement in itself, obviously, does not guarantee a correct or successful choice, but it contributes to improve guidance services. Although computerized systems are provided with an invariable content and structure, they are flexible enough to adapt sequences and the treatment given to individual needs of clients. An additional advantage is they can be used -at a reduced cost- by a number of persons with an important saving of time, if compared to traditional systems.

Counselors are also benefited by the capacity and speed of computers, for they release them of great part of the routine tasks in the guidance process (test administration and evaluation, providing information), allowing them to devote to more significant role activities such as personal interaction with clients, follow-up, evaluative research in the efficiency of the task they carry out.

Decades of working with traditional technologies have generated in some counselors a suspicious attitude towards the incorporation of computer science to its services. However, at Congresses and in communications with counselors who are users of these tools we have verified that when these tools begin to be introduced, they are highly satisfied with the benefits these techniques offer to make their services more efficient and fast.

The arrival of computer technology has substantially modified (simplified) the task in several jobs, thus redundancy has occurred. In Vocational Guidance, however, computer science technology would potentially allow professionals to carry out more faithfully the objectives related to assistance, prevention, education and development, service to populations with different characteristics and research. Computer-based tests and questionnaires as well as the evaluation they carry out may constitute a major contribution to the guidance functions that differentiate vocational counseling from other branches of applied psychology. It should not be surprising, then, that modern technology should be a potential facilitator for the development of the historical objectives in guidance.

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