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ABSTRACT

The Vocational Education Act of 1963 triggered the development of a number of computer based guidance projects. However a great majority of these projects have never been transplanted for field testing. Field implementation is essential in order to evaluate the systems and to provide information services which are lacking in many traditional noncomputer oriented guidance systems. The insufficiency of field deployment is due to the fact that the process is filled with major economic, operational, and psychological problems. Strategies for conquering the economic barriers include a search for funding of developmental research by private rather than by federal agencies, time-shared computer use with industrial computer users and other school districts, and the fostering of computer usage in other aspects in the life of the school district. To attempt alleviation of the operational problems an effort should be made to design computer based guidance around the more reliable types of hardware. To reduce psychological barriers students and counselors must be trained in the use of computers. Counselors must be informed of the capabilities of the computer guidance system and should be assisted in understanding the relationship between computer guidance and the schools' current guidance system. The principle means of overcoming fear and distrust however seems to be in increased use. (PSM)

SYSTEMS IMPLEMENTATION IN COMPUTER-BASED GUIDANCE

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The Vocational Education Act of 1963 triggered the development of a number of computer-based guidance projects.(14) The number of such projects under way to date is approaching twenty.(9) These efforts were generally in response to a felt need for better information systems in vocational guidance programs.

Unfortunately, a number of these projects such as Harvard's Information System for Vocational Decisions (ISVD) have been dismantled while still aborning due to the cut-backs in federal funds for such research and development. The great majority of these projects have never been transplanted for field testing outside the geographical communities in which they were created. Some continue to remain laboratory oddities with continued refinements and extensions of capabilities being added with little or not attempt to carry the laboratory product into the field for testing in more than one community.(17) A notable exception seems to be Interactive Learning Systems, a commercial venture.

NEED FOR FIELD IMPLEMENTATION

While further laboratory development and refinement of these systems is certainly possible and ultimately desirable, there is a pressing need today to extend the field trials of the more promising systems. Evaluation of existing systems should be conducted now, before further refinements are added. Failure to assess what technology has already wrought poses the risk of developing a highly engineered product which will not meet the needs of the actual market. We may be creating the Edsel all over again.

At this stage of computer-based guidance development, we have no firm research evidence that computer systems are better for specific populations than traditional guidance approaches or non-computer guidance information systems. While we certainly expect that computer information systems should be more effective, we have not yet asked the necessary research questions.(16) For example, there is a distinct possibility that a non-computer guidance system, if provided the same type of financial and energy investments that computer systems have received, might be just as effective in terms of satisfactory vocational decisions by a specific group of youths. Until a number of field trials involving the use of computer-provided information with various populations have been attempted

and their results analyzed, the efficacy of computer systems remains a matter of academic speculation and hope. Field testing is essential.

Even in their present incomplete stage of development, computer-based guidance systems provide another compelling reason for field implementation other than evaluation of the systems. This compelling reason is that a number of these systems do provide information services to the student which are lacking in many traditional non-computer oriented guidance systems. Better provision of pertinent decision-oriented information in guidance is feasible now through present computer systems. Millions of youths could profit by the improved information service provided by computer information systems. There is an agonizing need to bring this improved service to them.

BARRIERS

A very large part of the reason for the present insufficiency of deployment of computer systems in the field is not unawareness of the need to do so, but the fact that the process of deployment is frought with problems. Major problems appear to be economic, operational and psychological.

ECONOMIC BARRIERS

Among the experimenters in computer-based guidance today the major lament heard throughout the land is the drying up of the well of federal funds. Indirectly the federal money which flows through state education agencies under Title III of E.S.E.A. continues to support such endeavors as the Willowbrook and Bartlesville ventures. However even these discretionary funds threaten to fail in the non-too-distant future.

Unfortunately, as previously noted, only prototype systems are, for the most part, available. Consequently, reliable estimates concerning financial feasibility in the field are not available for non-prototype systems. The cost of developing a prototype system of computer-based guidance is estimated roughly as between $600,000 for the Bartlesville system to one and three-quarters million for Harvard's ISVD. Such figures inhibit even half-hearted consideration by most school officials.

Interactive Learning Systems which, owing to its commercial status, is forced to put a realistic price tag on its services, is one of the few if not the only computer-based guidance operation to provide a feasible cost-per-student fee to its prospective users. The fact that it has done so seems to have brought it increasing acceptance. Until other systems emulate this ability of I.L.S.

they will either remain the expensive toys of the R & D people, or they will go down the road to extinction like the dinosaur and ISVD.

One reason for the financial plight of computer guidance systems is that unlike the American Institutes for Research Comprehensive Vocational Guidance System most developers did not set out to design a system which would be within the reach of the normal finances of the majority of the nation's school districts. (18).

While the very nature of the economics problem suggests a simple cost-cutting solution, Blaschke pessimistically contends that cost savings in New York City secondary education would have to be in excess of $30 million to justify the use of the computer in education.(1) He bases his figure on estimates of the money now saved to school districts by the "free" resource of record keeping functions performed by teachers after school hours.

Perhaps an even more pessimistic view is offered by Cooley who contends that by the time computers become financially feasible in school guidance, the schools will be different enough to pose qualitatively different guidance problems. (2)

OPERATIONAL BARRIERS

Operational problems also impede broader field utilization of extant computer-based guidance systems. In a recent attempt to transfer the Total Guidance Information Support System (TGISS) package from Bartlesville to Texas A&M, a transfer which would have involved utilization of very similar hardware configurations, even minor differences in the cathode-ray-tube display equipment and the use of FASTER by the Bartlesville team posed unpalatable and delaying transfer problems.

Any such transposition of a system to another computer is always going to require a healthy amount of software adaptation. Basically this means at least a minimum team comprised of a zealous, dedicated computer systems man and several programmers. Relatively few school districts will be able to find this sort of team and still be able to cope with the financial factors discussed above. Such a team cannot be dismissed after the transplant of a system is made. Education and guidance are adaptive processes. If the system transplant is to be viable, it must be continually up-dated and modified to meet situational needs.

Besides this operational problem of a continuously employed software team, there is the ever-recurrent headache of hardware problems. Murphy's law applies to computer hardware as well as to any other technological mechanism. Malfunctions can and do recur relentlessly. Either a school district must be in or near a

metropolitan area in order to have engineering or technician hardware services within tolerable time limits, or it requires a live-in computer-service man with a charismatic gift for obtaining computer machinery cooperation.

Reliability of equipment is also only a small part of operational headaches. Equipment modifications result in extensive lead-time requirements for obtaining new equipment and also for removing the old. Machinery in the computer field is far from having the operational reliability and stability of the household refrigerator. Even if the financial problems already discussed or the psychological barriers to be taken up next did not exist, the threat of operational headaches also would keep many educational and guidance practitioners from attempting a field trial of an established computer-based guidance system.

PSYCHOLOGICAL BARRIERS

Perhaps the psychological barriers to field implementation are the most pervasive obstacles to be encountered. One major source of such psychological barriers is the present experiences with computers of counselors and students.

Counselors frequently react negatively to the idea of computer-based guidance because their present experience is in the area of the feeding and care of computers. They are frequently required to substitute as clerks preparing endless amounts of student-related data for computer consumption. Yet, this dogged slavishness to the computer's appetite for facts and numbers does not yield any perceptible contribution for the counselor's task of helping individual students.

Youths, on the other hand have their own unhappy background of experiences with computers. Usually these have involved the lengthy, confusing process of filling out data forms and registration forms coupled with the sometimes hopeless task of attempting to rectify computer errors. An even more damaging computer experience for students is the fouled-up schedule of classes to which scholastics have been exposed.(13)

Another threat facing counselors which may be real but is more likely only imaginary is that of the computer taking over their job. Perhaps the computer might take overna number of counselor functions, but most likely, it will first relieve him of information services and data handling. This relief is hardly a threat to a well-trained counselor although it might frighten the insecure dispenser of information and chief-clerk variety.

Apparently the chief threat perceived by both counselors and students is the threat of impersonalization. The use of computers in guidance looms as an additional

attempt to reduce the student to a social-security number. The threat of being computerized and programmed into his appropriate niche in the total economic machinery of the nation with its corresponding lack of individual fulfillment is closely related to youth's present rebellion against an impersonal social system.

STRATEGIES

The implementation of computer-based guidance systems in actual field situations, is needed both for the evaluation of the various systems and in order to bring existing capabilities to bear on the solution of individual and social problems. However, the principal barriers to this field implementation are perceived as financial, operational, and psychological. Having taken a clear look at the obstacles, it is subsequently necessary to study the potential strategies for conquering or circumventing the apparent hindrances.

ECONOMIC STRATEGIES

Present efforts at solving or circumventing economic barriers to systems implementation include a search for funding of developmental research by private rather than federal agencies. However, while this tactic might keep some development going it hardly promises to supply the funding needed for additional field utilization.

The drying-up of federal funding has, interestingly enough, lead to financial considerations which might have been utilized earlier had there been a financial need to do so. For example, talk in computer-based guidance circles now centers on the possibility of time-shared computer use with industrial computer users and with other school districts on a regional basis.(4,3,9) Another tactic is the fostering of computer usage in other aspects of the life of the school district in the hope of making the computer pay. Most school districts are not going to become involved with a computer in order to facilitate guidance. Other administrative uses or computer-assisted instruction uses will have to come first.(9)

That more economical systems can be operated is evidenced by the arrival on the scene of commercial ventures such as SELECT(8) and Interactive Learning Systems. Certainly a safe prediction for the future is that more corporate ventures in computer-based guidance will materialize and that corporate competition will tend to drive the cost per student downward.

While corporate intervention may have undesirable aspects in some situations, industry does offer an example of cost reduction. Practical cost-reducation

questions such as "Just what is to be automated?" and "How much is to beautomated?" offer one solution to cost barriers.(4)

OPERATIONAL STRATEGIES

Just how the operational headaches of an up-and-running computer-based guidance system can be alleviated is not too clear. The unreliability of technical machinery is the new American industrial malady. There is no readily apparent, simple strategy in this regard. One possible suggestion is that an attempt be made to design computer-based guidance around the more reliable types of hardware. Interactive Learning Systems use of the teletype terminal, which, while slow and noisy, suggests industry's tendency to select the "workhorse" equipment with sound functional reliability.

PSYCHOLOGICAL STRATEGIES

Compared to reducing cost and operational barriers with a view to enhancing field implementation, a relatively greater amount of consideration has been given to elimination of psychological barriers. The most urgent strategy in this regard is training in the use of the guidance machine. Both counselors and students need to be oriented to the use of computer guidance terminals and allowed sufficient time to familiarize themselves with the operation, capabilities and limitations of the mechanism. Users need to become comfortable in the use of the hardware.(11)

Counselors need to be informed concerning the present and future capabilities of the computer-guidance system. They can be shown that the computer will free them for actual counseling(13). Counselors can be shown the prospect of reduced work load (or at least a changed one), and improved data processing.(12) They can also be shown the potentials of computer-based diagnosis and prediction (10), and the possibility of computer scoring and analysis of tests(15).

In the process of systems implementation, the counselor should be assisted in perceiving the relationship of computer guidance to his school's own guidance program. If computer functions are kept minimal the counselor will be more likely to be accepting of the electronic marvel rather than threatened by it. Resistance can be lowered by decreasing threat to the counselor through his involvement in the planning and development of the systems implementation process.(5)

Psychological barriers to implementation may also be circumvented by careful adherence to a humanistic outlook during the design stages of a system.

Lohnes recounts that although this was attempted in the Systems Development Corporation project, developers still tend to over-emphasize the machine and neglect the human factors(7).

Where students have actually used computer systems in guidance, fears of impersonalization seem to vanish and positive cathection toward the computer occurs. At Willowbrook, 96% of the students view computer dialogue as interesting and personalized. At the Sixth Annual Symposium for Systems under Development for Vocational Guidance, held at Willowbrook, a student panel strongly reinforced this finding. Students even referred to the computer as "he."(19, 6)

The principal means for overcoming fear and distrust of the computer seems to be increased use. Thus the most likely way to foster field implementation of the system is increased field implementation!

This presentation has taken the position that the time has arrived for implementing computer-based guidance services in the field. The economic, operational and psychological barriers to implementation now are indeed formidable, but strategies for implementation have been suggested which should render these barriers surmountable.

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