Research Note 84-131

Design and Development of a Prototype Organizational Effectiveness Information System

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This report describes the development of a prototype information system for the use of Army Organizational Effectiveness Staff Officers (OESOs) and the Organizational Effectiveness Center and School (OECS). The purpose of the Organizational Effectiveness Information System (OEIS) is to shorten the learning time for the OESO to attain journeyman-level competence after going into the field and to provide information to OECS which will allow that school to assess the impact of its training and make any needed changes to its curriculum. (Continued)

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20. ABSTRACT (Cont'd.)

The OEIS consists of the following subsystems: (1) the Implementation and Design System (IDS), which is a database of information about past and ongoing OE operations; (2) the Survey System (SS), which allows the OESO to design questionnaires, process them automatically, and obtain summaries of the results; and (3) the Resource System (RS), which is an automated library of available OE resources (people, written references, and events). A Command Summary System, (CS), originally envisioned as part of the OEIS, was dropped as a requirement for the prototype. The OEIS prototype is implemented in a mainframe IBM environment using FOCUS, a non-procedural database management system. This approach was chosen over traditional system programming languages to shorten development time and to provide for flexible system enhancement and maintenance.

The utility of the OEIS remains to be fully tested. While software has been developed, an anticipated prototype test of the system was never implemented.

DESIGN AND DEVELOPMENT OF A PROTOTYPE ORGANIZATIONAL EFFECTIVENESS INFORMATION SYSTEM

EXECUTIVE SUMMARY

Requirement:

At present, there is no systematic means of collecting information on Organizational Effectiveness (OE) operations being conducted in the field. The availability of such information would shorten the learning time for Organizational Effectiveness Staff Officers (OESOs) to attain journeyman-level competence after going into the field and would also provide a basis for the Organizational Effectiveness Center and School (OECS) to assess the impact of its training and make any needed changes to its curriculum. The purpose of this research was to develop a prototype OE information system.

Procedure:

The approach was to determine the needs of the potential users and to design a prototype information system which would meet those needs.

Findings:

The Organizational Effectiveness Information System (OEIS) is a prototyope system which comprises the following subsystems: (1) the Implementation and Design System (IDS), which is a database of information about past and ongoing OE operations; (2) the Survey System (SS), which allows the OESO to design questionnaires, process them, and obtain summaries of the results; and (3) the Resource System (RS), which is an automated library of available OE resources (people, written references, and events). The OEIS prototype is implemented in a mainframe IBM environment using FOCUS, a non-procedural database management system. This approach was chosen over traditional system programming languages to shorten development time and to provide for flexible system enhancement and maintenance. The utility of the OEIS remains to be fully tested. While software has been developed, an anticipated prototype test of the system was never implemented.

Utilization of Findings:

Before the OEIS can be fully implemented, a test of the prototype is needed.

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DESIGN AND DEVELOPMENT OF A PROTOTYPE ORGANIZATIONAL EFFECTIVENESS INFORMATION SYSTEM

OVERVIEW OF THE PROJECT

The original title of the contract for the project was "Development of Organizational Effectiveness Measurement Concepts and Procedures." The contract was awarded to Arthur Young & Company in December, 1979 for $479,395.00. The project was to be completed in four tasks over a 42 month period. The following overview describes the contract requirements and work that has been accomplished. Appendix A provides a listing of important chronological events and their impact on the project.

Requirements of the Contract

The minimum requirements for the "OE measurement system" specified in the contract were:

a. Procedures for accepting organizational diagnostic data ranging over a fairly broad array of known or easily anticipated variables. These procedures shall be capable of analyzing such data in a manner so as to provide accurate, reliable, and useful diagnostic information to users, such as OESOs.

b. Database(s) constructed so as to portray the nature of the situation under consideration, the type of problem addressed, the nature of the intervention applied, and the outcome of that intervention.

c. Procedures capable of accepting and analyzing data that are generated as a function of OE follow-up and evaluation activities. To some degree, these procedures might be similar to the routines specified in (a) above.

d. Data management procedures capable of updating the database(s) as a function of data submission by users such as OESOs.[1]

The project was to be divided into four tasks:

Task 1 - Design Implications. The contractor was to research other efforts of similar scope and purpose, perform a user needs assessment, survey available and anticipated off-the-shelf Army software alternatives, and determine the availability and characteristics of hardware facilities that potentially could be used in the system.

Task 2 - Design and Prototype Development. The contractor was to choose and adopt a system concept and a development approach for the rest of the project.

[1]Quoted from Article M-2 of the contract, MDA 903-80-C-0216.

Task 3 - Pilot Test. A series of pilot tests were to be conducted to determine the prototype's operational utility. On completion of this task, "the system shall have been developed to the point where it can be implemented Army-wide in an effective and expeditious manner."[2]

TASK 4 - System Documentation. The required supporting system documentation, manuals and training materials were to be completed in this task. Training materials were to be prepared for all system users and for use in training students at the Organizational Effectiveness Center and School (OECS).

Contract Amendments and Changes in Scope

The first two tasks were addressed during the period of the contract. The most important parts of the system that evolved have been developed. Because of changes in scope and the difficulties cited in Appendix A, contract funds have been depleted. The following paragraphs briefly describe what has been accom lished.

Needs Analysis

Organizational Effectiveness Staff Officers (OESOs) were interviewed during Task 1. They did not have a concept that extended beyond the notion of a survey system more refined than the system then in use. That system used the General Organizational Questionnaire (GOQ) which was processed through batch processing at data processing installations. The output from the survey resulted in a large volume of printouts and very crude graphics. OESOs wanted to eliminate the tedious jobs of processing the GOQ questionnaires and analyzing the voluminous output.

The Organizational Effectiveness Center and School (OECS) conducted a conference in June, 1979, that attempted to define the characteristics of an OE Measurement System. The results were helpful, but only at a very general level. They required much further definition.

The contractor discovered only one other project that appeared to have some direct bearing. It was known as CANOPUS. It was a diagnostic and prescriptive system being designed by the Institute for Social Research, University of Michigan, for the Navy. Close inspection indicated that the resulting prescriptions were, in the contractor's opinion, too limited to be useful. A different approach was required.

The Principal Investigator had been extensively associated with military OE for seven years and was also the Principal Investigator of another ARI project to analyze the impact of the Army's OE Program. This earlier project was completed in April, 1982. Using the 1979 OECS Conference

[2] Page 23 of the Contract, MDA 903-80-C-0216.

results and what was learned during the data collection phase of the OE Impact Study, he developed the needs assessment that led to the conceptual design for what is now known as the OE Information System (OEIS). A brief description of the needs that were identified follows.

1. OESOs need to learn from one another. The training for OESOs has been the best of its kind in the world. It is an intense, practitioner-oriented type of training and includes a field training exercise (FTX) as part of the basic 16-week course. In the field, new OESOs learn how to manage changes in themselves and how to perform a consultant role with their more senior clients. It takes about one year for the average consultant to become reasonably competent in this new role. Tour lengths of OESOs normally do not exceed three years. An information system is needed that reduces the first year's learning time, and provides the opportunity for all OESOs to learn the strategies and methods that are most likely to succeed in a given context. In order to do this, an information learning system must be capable of providing the OESO with a gauge that shows how successful alternative strategies and methods have been. This approach creates a circular requirement: the same people (OESOs) who use the information must provide it. Such a learning system requires that the strategies and methods used in OE operations be evaluated.

OE or Organization Development (OD) in the military or civilian sector has a very long and consistent record of not evaluating operations or interventions. Only 9% or three of the 35 cases in the OE Impact Study were formally evaluated by OESOs even though it is the Army's policy to evaluate OE operations (James, McCorcle, Brothers, & Oliver, 1984).

2. OESOs need an improved survey process. A survey questionnaire is the most efficient way of obtaining information from a large number of people. The existing survey support process for the GOQ is not satisfactory. Most OESOs elect not to use it, because it is difficult to process survey responses and to analyze the resulting computer-generated output. In addition to simplifying the task of processing survey responses, the survey itself needs to be improved and computer printouts need to be designed so that they have higher utility and are more easily understood, not only by the OESO but by the client. The processing problem requires some sort of easy-to-use data input device, such as an optical scanner. The survey needs to be revised so that there is a way of comparing the present state with some other desired state. A revised printout format is required that aggregates information at a level that eliminates unnecessary manual data manipulation and presents it graphically.

3. OESOs need current information resources and access to experts. OESOs often work in situations where library resources are limited. They encounter specific problems that have occurred elsewhere and have been solved, but they have no way of quickly and efficiently obtaining these solutions. This suggests that OESOs should have access to a library directory in which current references of high utility to a practitioner could be stored. It also suggests a directory of persons expert in those

problem areas an OESO is likely to encounter during OE operation. An information system should also provide a listing of future training and conference events of interest to OESOs, with an assessment of past utility.

4. OE Program Managers need management information of higher utility. In 1980, the OE Program Managers were receiving a fair amount of informal information through meetings with other OESOs, and anecdotal information from senior and General Officers once a year. They received very little clear-cut routine management information that measured the Program's utility to its constituents or indicated how well it was resourced. A management reporting system was needed that provided three kinds of information. First, a measure showing the demand for OE services; second, an assessment of whether resources were sufficient to meet current and future demand; and finally, an account of trends and issues affecting the Program.[3]

5. Researchers need information about the change process. The Army continues to experience increasing changes induced by its mission, society and new technology. There is a need for research on how best to manage this change in the military. On-site case studies conducted by researchers are expensive and impractical. An information system is needed that could systematically collect data and make it available to the research community.

6. OECS needs information that could assist in strengthening the curriculum. The school continues to evaluate its effectiveness through surveys and site visits. However, since there has been no consistent method used in evaluating OE operations, it has been difficult to assess the true effectiveness of the school's curriculum. There is a need to provide the school with information that can indicate the effectiveness of OESO training by using the measure most reflective of the OESO's competence--the degree to which operations succeed in the field. With that information, the curriculum could be modified and improved over time.

Description of the OEIS

The conceptual design of the OEIS was created without specific consideration of hardware or software constraints, so that the system had the highest likelihood of satisfying the needs identified above. As the prototype system evolved, choices about hardware and software were made. The Army chose a prototype that would provide OESOs in the field (e.g., an OE Office at a major installation) with an intelligent terminal and appropriate video display, an optical scanner, data communications capability and a printer capable of producing graphics of moderate quality. The system's database would be maintained at one host site in a large mini-computer or mainframe. A likely site would be OECS.

[3]This requirement was deleted and is not incorporated in the OEIS.

Keeping the basic hardware components of the prototype in mind, a description of the subsystems of the OEIS and the way these subsystems satisfy user requirements follow:

1. The Implementation and Design System (IDS). The IDS satisfies the learning and research needs of OESOs, researchers and OECS (needs 1, 5 and 6). It is a very carefully constructed case reporting system. Using a structured case reporting format, an OESO enters case information during an operation into the system's data base by using the intelligent terminal. The report format is comprised of consecutive queries which cover all parts of an OE operation--OESO and client information, entry assessment, data collection and analysis, feedback, diagnosis, implementation, and evaluation.

The case report is constructed so that OESOs can retrieve cases that are most similar to the operation they are working on. The OESO does this by providing the organization type, the demographic descriptors involved and the general type of issue (using the Army's adaptation of the Kast and Rosenzweig (1974) systems model), and by considering the client organization's readiness to use planned change. A simple example might be:

Type of organization: Mechanized Infantry Battalion
Demographic descriptors involved: Company Commanders and S3, 02 and 03 grades
K & R model subsystems involved: Mission
Degree of readiness for change: Medium

The host computer searches the data bank for similar cases. When they have been found, abstracts of the most appropriate cases are provided to the interested OESO that includes a rating that indicates how successful the case was, a brief description of the case, and an index representing the command's readiness for change when the case began. The OESO selects cases of greatest interest from the abstracts and is provided with full case reports via the intelligent terminal from the host site.

Data entry for the IDS: The IDS is an automated prototype of the structured case format. For a more detailed description of the structured case format, see the OEIS General Systems Design Draft document. The IDS fills two basic functional modes--as a data entry mechanism for all phases of the structured case and as an interactive query and reporting system.

The data entry function follows the phases of the structured case format. Below is a listing of these phases and the main type of information captured during each phase.

PHASE NAME	TYPE OF INFORMATION
Case Initiation	Unique case ID number, data that defines the user's specific location and environment.
Assessment	Feedback on completion of the first phase, intensity of process observations and interviews, special target groups, survey question valuation, Results-Oriented OE (ROOE) subcategory rank, diagnosis, receptivity, text explaining the problem in detail.
Planning	Definition of roles, session timing, slack and stability in user's organization, evaluation of training/coaching steps taken by key user subordinate, opposing groups, supporting groups, outcomes, plan explanation.
Implementation	Redefinition/confirmation of user's and OEC's roles, evaluation of level and type of change, reaction to implementation, problem structure employed, problem diffusion, mid-course change, leadership/ management approval, mid-course improvement, immediate outcomes, follow-up.
Evaluation	Evaluation of the implementation, evaluation of expectations, problem explanations, narrative responses.
Case Closeout	Summary Abstract, evaluation of the success of the operation, premature/normal closeout indicator.

The IDS module begins by verifying that the user has a valid OESO Identifier. Once the OESO Identifier has been verified, a menu is displayed which lists the phases and gives the user the opportunity to select the phase to be input or edited. If the user chooses to add a case, the IDS module checks to make sure that the case does not already exist. If the user chooses to update an existing case, the IDS module requires a password and verifies the OESO Identifier as an authorized user for the case. Then the IDS module checks the case to make sure it has not been closed out (closed cases cannot be edited).

Once a phase has been selected, a menu of subsections available for input or update is displayed. When one of these subsections has been selected, the user is presented with either a code-oriented data entry screen or the text editor. In order to conserve disk space, responses to standard questions have been converted to codes wherever possible. Where

responses are not predictable enough to be coded or an explanation is required, the text editor provides the user with the ability to enter narrative text in support of coded responses.

A functional description of each of the phase modules, including a listing of all of the screens, is available in the Organizational Effectiveness Information System Users Guide.

Reporting functions for the IDS: The reporting capabilities of the IDS include standard reports and ad hoc query capabilities. There are six standard reports in the IDS, one for each phase of the structured case and one that gives the entire structured case format. These standard reports list out all of the information on a selected case. The information contained in these reports can be used:

- As a review source for an OESO to review his/her current and prior operations
- As a source of information for another OESO to review similar cases to provide insight into his/her current case

The information reported in the standard reports comes directly from the phase databases. Where a response has been coded in a cryptic format to save space on the storage medium, these responses are translated into their original format.

An example of the standard reports containing samples of all of the relevant types of data is the planning phase report. This report, which is also contained in the structured case format, consists of the following:

- A phase index report
- Key user subordinate report
- Identification of support and opposition.
- Supporting groups report
- Outcomes report
- Plan explanation report

The planning phase index report contains case administration data and specific ratings for this case. The case administration data consists of dates the phase was started, ended, and the last time it was updated. The ratings consist of:

- Ratings of the levels of slack and stability
- Whether the user was coached

- o Whether an evaluation plan was agreed on
- o Whether the OEIS helped in the planning phase

The next reports identify key user subordinates and the support for and opposition to the operation.

The outcomes report lists the description of outcomes by problem. The description includes:

(1) The Problem/Issue

(2) Who/What

(3) Desired Behaviors

(4) Desired Hard Outcome Measures

The plan explanation report lists textual descriptions of the relevant areas from among the following:

(1) Opposition to Operation

(2) Support for Operation

(3) Criteria for Chosen Objectives

(4) Potential Problems for not Coaching the User

(5) Structure of Planning/Coaching

(6) What Boundary Changes were Coached

(7) Why User not Coached on Boundaries

(8) Reasons Evaluation Plan not Agreed Upon

(9) Effects of OEIS on Planning Phase/Improvements

The volume of the plann ng phase report will depend on the volume of the textual descriptions and the number of groups or problems listed in the file.

By using the ad hoc capabilities to perform interactive inquiries on these data, the OESO can analyze all of the cases in the database. An OESO might be interested in what percentage of cases in the last two years did not involve coaching; or in what percentage of cases the OESO, the user, and the user's subordinate had the same roles; or how his/her quantitative data compare to the results of his/her prior cases. This type of information is possible through the ad hoc capabilities.

The structured case report format is designed so that, wherever possible, quantitative data can be entered. Where necessary, narrative responses are also entered. The report is also designed using a very explicit philosophy of OE which resulted from the OE Impact Study. The basic elements are briefly described as follows:

- Successful OE operations are based on a clear strategy carefully selected by the OESO and user. The strategy chosen is dictated by the organizational context and the outcomes chosen for the operation.

- OE is distinguished from other organizational change methods because of the emphasis on gaining commitment to a change from subordinates. There are situations in which change is not dependent on subordinate commitment. In those instances, use of OE is probably inappropriate.

- An intervention cannot be described using simple labels. It can only be described adequately as a series of linked events that are structured by the OESO, through the user, using what is known about organizational behavior and technology.

- Interventions are most successful where the OESO and the user are careful to create structures in the process that communicate or diffuse appropriate information about the operation. This is done so that each event has the potential of generating increased commitment to the change. When structures to diffuse this information are neglected, subordinates almost always fill that information void with their own, negative information. The negative views degrade potential success of an operation and can cause an operation to fail. The structured case report format is designed to guide OESOs during an operation to consider these concepts and to report the way they structure the operation's events, so that further research can be conducted and other OESOs can replicate successes and avoid failures.

The IDS will only be used if OESOs believe that it has a very high potential utility for them. Therefore, the structured case report format has been limited to questions of interest primarily to OESOs.

To create an IDS of high utility also requires that operations be evaluated consistently and reliably and that they be documented to permit comparisons between cases. The OE Impact Study evaluation method is a simple and proven method that requires relatively little time. It is estimated that about one day of evaluation effort would be required by an OESO for an average battalion-sized operation.

Finally, the case reporting process must not be too time-consuming or the OESO will avoid making reports. Since the reporting process uses screen queries and menus to simplify data entry, it is estimated that only 4-6 hours of data entry time would be required for the average battalion-sized operation.

The IDS has the potential to reduce OESO start-up time and to provide OESOs with a way of continually refining operations that have succeeded previously in a particular context. Most cases will include the name and location of the OESO who performed the work. Other OESOs will be able to contact the experienced OESO and obtain even more detail. It is likely that valuable support networks will result.

The host computer will have a large statistical capability that will enable researchers to correlate in an aggregate of cases any closed-ended response with any other closed-ended response, in order to discover or confirm relationships.

Finally, aggregate cases can be analyzed by OECS using OESO Class Numbers as the basis for selection to determine the effectiveness of OECS training and to detect areas where the curriculum needs to be modified or improved.

2. The Survey System (SS). The Survey System is designed to replace the awkward batch processing of the GOQ currently in use (Need 2). The survey questionnaire and processing would all be accomplished using the on-site intelligent terminal. The contract did not include funding to develop a survey questionnaire. However, the system incorporates a revised questionnaire format that uses both "as is" and "desired future" responses on a five-point Likert scale. The Army can insert any questions it wants. The questionnaire always includes a limited set of about 30 "core" questions of special interest to the Army. An additional 86 questions can be added. These questions can be designed by the OESO or taken from a bank of questions prepared by the Army. Each question in the prepared question bank is monitored by the SS software to determine those questions that are most helpful to OESOs over time or those that should be replaced with other, more useful questions.

When the survey has been administered, the OESO can process the responses using the optical scanner and data communications facilities to enter survey data in the host computer. The output format should be presented in tabular and graphic form, so that it can be analyzed easily by the OESO and used directly with the client.

While the use of the "as is" and "desired feature" format for the questionnaire avoids having to use norms, it is the Army's intention to establish a normative database based on the 30 core questions. This small set of questions and the resultant data would be used to monitor overall trends in selected areas of interest.

The pool of standard and core questions will be maintained by OECS through an option of the Survey Subsystem. This option provides procedures to add, modify and archive questions in the database as well as to produce reports based on the contents of the database. The following reports are available through this option.

(1) Count of Active Questions by Type of Question

(2) Text of All Active Questions in Pool (Numerical Order)

(3) Count of Inactive Questions by Type of Question

In addition to these reports, a series of standard reports still needs to be coded to report survey results and to analyze the normative data. These reports are specifically identified in the System Documentation.

3. The Resource System (RS). The Resource System provides a pool of information on OE resources available to the OE community. These resources fall into two categories:

- o Personnel resources
- o Library resources.

In addition, the Resource System contains information on OE-related events, such as seminars or workshops, that may be of interest to OESOs.

The content of the RS is to be limited to the information that has the greatest utility to the OESO. It is not a system that accumulates "all" the reference material related to OE. The files would probably be maintained by OECS. The OESO would access the information through his/her intelligent terminal from the host site. The Resource System was subdivided into three directories:

- o the Personnel Directory
- o the Library Directory
- o the Event Directory.

A description of each of these directories is presented in the following paragraphs. A functional description of these directories and associated processing screens can be found in the OEIS User Manual.

(a) Personnel Directory

The Personnel Directory contains information on expert Army personnel who have acquired OE skills that may be of interest to practicing OESOs. The Resource System allows users of the Personnel Directory to select from the following processing options:

- Add a new Personnel record.
- Change an existing Personnel record.
- Generate a sorted listing of all Personnel records contained in the directory.
- Generate a yearly letter to all the program managers who supervise the personnel contained in the directory. Program managers are responsible for reviewing and updating the information. The new information is then entered into the system via the record modification option.
- Query the Personnel Directory to identify individuals who have the OE skills specified by the user in the query request.

The Query of the Personnel Directory is the only option available to OESOs. The remaining options should be restricted to personnel who are responsible for insuring that the Personnel Directory remains current.

All Personnel Directory options have been developed. The procedure that restricts access to authorized users must be developed when the authorized users have been identified. The information contained in the Personnel Directory includes:

- Name
- Personnel type
- Rank or GS level
- Address
- Telephone number
- A maximum of three skills codes
- The name of the person's Program Manager
- A flag indicating whether the person wishes to be listed as a contact for the specific OE skills listed above.

In addition, the Personnel Directory contains specific information on personnel who are also OESOs, such as:

- OESO identifier
- OESO's graduating class number

- The number of months of OE experience
- A flag indicating whether the OESO is active or inactive.

A complete description of the data elements contained in the Personnel Directory can be found in the master file description for the file named ADDIR.

(b) Library Directory

The Library Directory contains information on written material, such as books, periodicals or other documents, that may be of assistance to OESOs in the performance of their duties. It contains the following information on written reference resources:

- Author's name
- Document title
- Publication year
- A flag indicating whether the document has been microfiched
- A code indicating the type of document (Book, Periodical or other document)
- The issue number, volume number and article title if the document is a periodical
- The subject heading(s) under which the document is classified
- The OE description(s) that pertain to the document.

In addition, each document will also have an abstract, which highlights the relevant information contained in the original document.

A complete description of the data elements contained in the Library Directory can be found in the master file description for the file named LIBDIR

The Resource System allows users of the Library Directory to select from the following processing options:

- Add a new document record to the Directory. Adding a new document to the Directory involves entering both the document information and the document abstract.
- Modify an existing document or document abstract, if the information contained in the Directory is erroneous or incomplete.

- Generate a listing of all the documents contained in the Directory, sorted by Document Number. The listing is used to review the information contained in the Directory.

- Query the Library Directory to identify document resources that may be of interest to the user issuing the request. The Library Directory can be queried using any or all of the following selection factors:

  -- Author last name

  -- Document title

  -- Up to three subject heading codes

  -- Up to three OE description codes.

The Query of the Library Directory is the only option available to OESOs. All other options should be restricted to OECS Library personnel who are responsible for maintaining the Library Directory.

All Library Directory processing options have been developed. The procedures to restrict access to these options must be developed.

(c) Event Directory

The Event Directory contains information on future OE-related events, such as continuing education workshops or seminars, which may be of interest to practicing OESOs. The information contained in the Event Directory includes:

- The calendar quarter during which the event is held

- The starting date and time, and ending date and time of the event

- The name of the event

- Up to four lines describing the event

- The event sponsor

- The location at which the event is held

- The name and telephone number of a contact to register for the event

- The cost of the event
- Up to four lines which assess the value of the event, based on the experiences of previous attendees.

A complete description of the data elements contained in the Event Directory can be found in the master file description for the file named EVEDIR.

The Resource System allows users of the Event Directory to select from the following processing options.

- Add a new event to the Directory
- Generate a listing of information for all events contained in the Directory, sorted by event number
- Query the Event Directory to list all events of interest to the OESO. The OESO is first asked to enter the calendar quarter in which he is interested. The system will produce a list of all events occurring during that quarter. The OESO can then select particular events held during that quarter to receive the entire set of information for the selected event.

The Query of the Event Directory is the only option available to OESOs. Access to all other options should be restricted to personnel who are responsible for maintaining the Event Directory.

All Event Directory Processing options have been implemented. The procedures to restrict access to particular processing options must be developed.

4. Command Summary system (CS). The Command Summary system was initially included in the General System Design, but was subsequently dropped as a requirement for the OEIS prototype system. A functional description of the Command Summary system can be found in the General System Design document.

The Command Summary was initially designed to support the compilation of quantitative information from the Semi-Annual Program Manager's Report and the Annual OE Command Summary Report. Consequently, the Command Summary data resides in two files:

- The Semi-annual File (SEMIFIL)
- The Annual File (ANNFIL).

These files contain the information described in Appendix B of the General System Design. A complete description of the data elements for the Command Summary System can be found in the master file descriptions for ANNFIL and SEMIFIL.

The definition of the databases for the Command Summary system are the only portions of the system which have been developed. Should the CS be reinstated, the menu systems, processing modules, report-generating modules and right-to-access definitions must be developed before the system can become operational.

PROJECT PRODUCTS

The project has produced six products. They are described in the following section.

1. Working Paper: Organizational Effectiveness Management Information System Requirements Statement - Submission Date: October 22, 1980. This working paper set forth the initial findings stemming from work on Task 1. It outlined the needs that the OEIS should satisfy for all prospective users. It presented a very conceptual and general model that could provide the needed services. This model was the basis primarily for the IDS and, to a lesser extent, the SS and RS. The document's main purpose was to serve as a vehicle through which all persons concerned with the project could agree on a statement of the problem and a potential ideal solution to that problem before proceeding to the next level of definition. The ideal solution presented was approved for further specification.

2. Phase I Technical Report - Submission Date: March 25, 1981. This report responded to the Task 1 "deliverable" requirement to present design implications for the overall system. In addition, the report also presented an initial conceptual design for all four OEIS subsystems and five alternative OEIS implementation approaches. At one end of the spectrum of approaches was the system actually chosen by the Army for the prototype that uses intelligent terminals linked to a host site. The other end of the spectrum was simply a central computer site that would convert handwritten structured case reports submitted via mail and store them in a computer. The central site would answer telephone queries from OESOs in the field for information about similar cases to those the OESOs would be working on searching the data base. The site would provide the OESOs with case numbers and the OESOs would then refer to their own on-site microfiche file for more detailed information. The RS was provided through microfiche. The SS capability was not fully resolved in this alternative, because information about how the OEIS might use future Army data processing service was difficult to obtain and assess. The contractor suggested that survey responses be mailed to a central site for processing and the output returned to the OESO for use.

The survey system was difficult to design at any but the most general level, because the design was essentially dictated by choices for hardware and the prototype system architecture. The report described the possible alternatives for a survey system and requested that specific decisions be

made so that if necessary, the conceptual design could be completed. Several decisions were required for work to continue. OECS had been assigned as the project sponsor in January 1981. In May 1981, approval was obtained from OECS to proceed with the IDS, RS and CS. No decision concerning the SS was made at this time. OECS decided to select the most automated implementation approach of those presented.

In September 1982, project sponsorship was returned to the OE Office of the Department of the Army. A decision was then made to include a survey system in the OEIS. Work then resumed on the SS as well, and a design concept for the SS was prepared.

3. Organizational Effectiveness Survey System Design Concept Draft - Submission Date: November, 1982. This document presented a conceptual design for the SS that was comparable to the level of detail found in the Phase I Technical Report for the other subsystems. It defined the functional requirements and described the inputs and outputs and the database of the system. It was prepared to insure that the contractor and sponsor were in agreement about the design of this part of OEIS. Approval of the concept was obtained soon after submission, and the next level of system definition was prepared.

4. Organizational Effectiveness System General Systems Design - Submission Date: December 30, 1982. This document specified the design of all four subsystems at a level which included a preliminary sample of more refined description for all inputs and outputs, functional data flows, and the generic hardware/software required to construct and test the prototype. It was approved and was the basis for the development of the system software.

5. OE Information System Prototype Software. The detailed design and software completed under the contract will be delivered on contract termination. The software was developed using Information Builders, Inc. non-procedural language called FOCUS. This programming language was chosen because it reduces programming time required by earlier generations of programming languages. Unavoidable delays were encountered in securing FOCUS and obtaining a computer to support software development. Because of heavy demands on the United States Army Management Systems Support Agency (USAMSSA) computer, system response and availability were poor. As a result, programming of the OEIS was impeded.

A prototype test plan was prepared in January 1984 in order to complete Task 3 of the contract. However, the requirement for a thorough test was eliminated by the COTR because of insufficiency of funds. The contract funds were depleted faster than planned because of the lack of support to the programming team, poor system response, and inaccuracies in estimating costs. Completion of Task 4, system documentation, manuals, and training materials were considered to be more important than the conduct of a prototype test in the light of the broad support from the OE community already mentioned. In March 1984, it was determined that there

were insufficient funds remaining to complete Task 4 in its entirety. Final project deliverables are: user documentation, this report, and OEIS system software composed of:

- o the IDS 99% complete
- o the SS 90% complete
- o the RS 100% complete
- o the CS 15% complete

The CS data base and the initial menu system have been designed. Additional menus, if necessary, as well as data base update and reporting procedures must be developed if OECS decides to reinstitute the Command Summary System.

All systems will be unit-tested prior to delivery. A description of enhancements required to implement the prototype in a test environment are contained in the working paper document, OEIS System Documentation.

THE POTENTIAL VALUE OF OEIS TO THE ARMY

The OE Impact Study's investigation of 35 OE operations in the 1980-81 timeframe concluded that about half the OE operations were unsuccessful (James et al., 1984).

If the OE Program is to be improved, the most obvious place to begin would be to reduce the number of unsuccessful cases. The Impact Study identified two major reasons for the occurrence of these lacks of success. The first was that OESOs attempted to apply OE in organizations and with clients where the use of a commitment-generating strategy for change was inappropriate. A model called the "Entry Assessment Model" was developed to diagnose situations and avoid these potential failures. This model is included in the IDS. The OESO merely assesses the dimensions of the model, and the software provides a prescriptive guideline on the screen about whether to proceed and how to proceed, if that is appropriate.

The second reason for lack of success was related to a choice of operation outcomes that neglected to consider the impact of some important situational variables:

- o slack -- the number of resources available in the organization to apply to the change process.
- o personnel stability -- the percentage of key implementors and top managers who would be present throughout the change transition period.

- o organization size in relation to diffusion -- the larger the organization affected directly by the change, the more important and difficult diffusion becomes.

Various combinations of organization size, slack and personnel stability operate in ways which dictate the breadth and period over which change objectives can effectively be implemented. It appeared that many OESOs failed to take these factors into account with their clients in the Impact Study cases. The result was selection of objectives that had a very low probability of succeeding and implementation of a change process without appropriate structures for diffusion. The IDS incorporates these concepts in a prescriptive model. The OESO merely assesses the organization size directly affected by the change, the slack and the stability of key implementors and top managers. IDS software provides a prescriptive guideline on the screen about how to proceed. Thus the IDS has the potential for reducing the failure rate of OE operations. The most likely way this will occur is through the use of the IDS in conjunction with compatible training in the OECS curriculum. The IDS also has the potential to improve already successful operations. The structured case report format requires that continued attention be given to measurable outcomes of behavior change and changes in "hard outcomes" such as person hour savings, cost savings, higher levels of operational readiness, etc. The use of the IDS will require that OECS build the curriculum on a true action research approach that emphasizes the important interdependence between the social and the technical aspects of change. It is interesting to note that the OE Impact Study showed that operations that focused only on interpersonal/intergroup relationships or process objectives tended to be less successful than those cases that addressed process issues that interfaced with technological type issues.

The Survey System also has the potential to improve the quality of operations by providing OESOs with a greatly improved and more efficient diagnostic tool, particularly for larger organizations. The Resource System can assist in adding greater quality by giving OESOs access to relevant information and experience.

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