ORDER PROCESSING AND INVENTORY CONTROL SOFTWARE RELATED TO COMPUTER USER SATISFACTION: AN INTERACTIVE ONLINE EVALUATION SYSTEM

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ABSTRACT

The selection of an order processing and inventory control (OPICS) system is a complicated process. The overall satisfaction derived from a system depends on many variables. This study analyzes the influence of OPICS predictor variables on overall satisfaction as determined by multiple regression. This study confirms the theories that suggest that OPICS ease of operation, reliability of computer, *and ease of programming are the major determinants of overall computer user satisfaction.*

INTRODUCTION AND OVERVIEW

The information obtained by user ratings of Order Processing and Inventory Control Software (OPICS) systems, could be very useful to OPICS buyers and sellers who would like to see some type of rating scale about these systems before deciding which type of system to buy or sell (Datapro, 1984).

Traditionally, buyers or sellers who are interested in evaluating overall user satisfaction of a potential new OPICS system have two options. One option is to study the technical specifications of the different OPICS systems and their respective user satisfaction reports. The disadvantages of this option are that the buyer or seller may not have the time, nor the technical expertise to understand the specifications. Moreover, many user satisfaction studies of OPICS systems are often incomplete, vague, inaccurate, subjective, ambiguous, non-quantitative, and/or most importantly too narrow to be statistically generalizable (Bilbrey and House, 1981; Turney and Laitala, 1976).

Another option that is available to buyers and sellers of OPICS systems is to hire consultants who can understand the technical specifications, discount inaccuracies and subjective judgments of trade publications, and most importantly use generic information to make suggestions custom-tailored to a particular installation. The main disadvantage of this option is that such experts are hard to come by, disruptive to the normal operation and rather expensive (Grueberger, 1981).

This paper presents another option: software which has tabulated user ratings from online questionnaires and makes direct comparisons to industry standards. The original data, collected by an impartial company in an extensive survey, is used to analyze which variables contribute most to user satisfaction and to generate the smaller questionnaire for the interactive component. Information in this data base can be made available to prospective buyers, but even more importantly, would remain in place to monitor user satisfaction on an ongoing basis. The system can help users isolate problem areas and suggest solutions while constantly updating the user satisfaction files through telecommunication networks.

The 3 major objectives of this study are as follows:
1) Data collection and evaluation of variables
2) Creation of the industry wide standards database
3) Design of the evaluation system for ongoing user satisfaction

DUE TO SPACE CONSTRAINTS, THE APPENDICES WILL BE AVAILABLE UPON REQUEST.

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THEORETICAL FOUNDATIONS AND LITERATURE REVIEW

Theories of Consumer Satisfaction (CS) suggest that prior to purchase consumers form expectations concerning the future performance of products such as OPICS systems (Anderson, 1982; Olshavsky, 1972; Olson and Dover, 1979; Swan and Martin, 1981; Swan and Trawick, 1981). Accordingly, the authors hypothesize that a positive relationship exists between the degree of meeting user expectations, and the overall user satisfaction.

Traditionally, there has been a clear distinction among micro, mini, and mainframe computers. The power and capabilities of OPICS systems have improved over the years; memory costs have gone down and performance distinctions between different systems have blurred (Sample, 1981). This challenges the traditional size distinction and its implications for evaluations. Thus, it is important to investigate if the traditional characteristics of size (whether it is a micro, mini, or mainframe) actually do have an effect on user satisfaction. Thus, one of the objectives of this study is to determine whether the size of the OPICS computer has any effect on user satisfaction. Therefore, if an installation has three types of computers, micros, minis, and mainframes, then three separate ES runs have to be executed (Appendix A).

Choosing the right OPICS from the bewildering array of systems, manufacturers and different configurations of components can be a frustrating and expensive experience for buyers and vendors alike (Barcus and Boer, 1981). If the parameters of OPICS users' satisfaction were known, then users' satisfaction could be maximized and the frustration level could be reduced, or at least controlled.

Buyers of OPICS systems should look at advantages and/or disadvantages in cost, ease of operation, system reliability, and vendor reliability, such as established vending firms vs. newer and smaller firms (Cheney, 1979). Accordingly, the cost should be one of the most important determinants of user satisfaction. This may also suggest the inclusion of criterion variables that indicate the popularity of the vendor. Other such criterion variables include the number of systems, their average useful life, and the number of users that are using these systems.

In addition, due to the rapidly changing technology, management must be willing to commit time to the conversion of an outdated system. Thus the ease of conversion should be included in the study as an important determinant of user satisfaction. One can hypothesize that the easier the conversion process, the more satisfied the OPICS users should be. Comparison of OPICS systems should be done in the areas of support, service, ease of operation, compatibility and reliability of the computer, peripherals, compilers, and assemblers, as well as the cost of purchase and operation (Farmer, 1981). Therefore, the authors expect these variables to be positively correlated with satisfaction.

The importance of having a written contract with the vendor has been discussed in the literature (Brandon, 1980). A thorough contract should cover reliability, performance, operating system compatibility, effectiveness, training, costs, and trouble shooting. Some studies cite maintenance, service, education, and documentation as the top concerns of OPICS system users. Applications availability and reliability have been next highly rated with price being the most important criterion after that (Rosenfeld, 1980). Therefore, such criterion variables have been incorporated into this ES model and are expected to positively correlate with overall satisfaction.

Some research reports that user support in terms of education and documentation seems to affect user satisfaction. Scannell (1982) has cited that users find software and support to be major problems. However, complaints that the computer industry does not provide adequate training, documentation, and manuals for users have been rebuffed by industry representatives (Lean et al., 1983).

Questions have been raised about the effectiveness and responsiveness of traditional system maintenance services (Allerton, 1983; Howard, 1983). The issue of centralization vs. decentralization concerning maintenance contracts has been addressed (Linzey, 1983). The authors of the present study explore a different facet, the impact of the effectiveness and responsiveness of maintenance services on overall user satisfaction.

Another issue that may affect OPICS user satisfaction is the method of acquisition. According to Kelly (1980) the impact of buying or leasing may be substantial. Therefore, these criterion variables are evaluated in the present model.

ORDER PROCESSING AND INVENTORY CONTROL SOFTWARE (OPICS) PRACTICE AND THEORY

Both practitioners and theorists have been struggling with various aspects of OPICS systems. Some practitioners have raised perplexing questions. See, for example, "Computerization: A Necessity for Material Management" (Kimmel and Gjerdingen, 1984), and "Multidisciplinary Computer Inventory Controls" (Cavicchi, Memos and Priest, 1984).

Choosing an appropriate OPICS system and recognizing its limitations have been among the most difficult and confusing tasks for the inventory control managers (Goldberg, 1984; Harrington, 1984).

A better understanding of the determinants of OPICS user satisfaction could not only partially answer the above questions, but could also facilitate the task of choosing a system and recognizing its limitations.

Theorists have wrestled with the problems from a more scientific point of view. They have examined the demise of simple inventory control (Randall, 1983), focused on decision support systems (Crescenzi and Gulden, 1983) and assessed decision aids (Benbasat and Dexter, 1982). Much like the present study, surveys of OPICS techniques have been conducted, although they fell short of rigorous, empirical, and comprehensive coverage of OPICS user satisfaction.

Meanwhile, strides have been made in developing evaluation systems (ES) as they relate to OPICS (Hansen and Messier, 1982). However, as in previous studies, the issue of user satisfaction has not been fully addressed. Therefore, the principal objective of this study is to supplement previous studies, and to integrate the issue of user satisfaction into the ES model, while building upon prior theoretical work.

EVALUATION SYSTEM (ES) DESIGN

A less traditional option is to use an evaluation system to aid in the evaluation of overall user satisfaction. Evaluation systems (ES) are specialized decision aids, which provide quantitative and qualitative analysis, probabilistic estimates and their respective explanations (Stefik et al., 1982; Duda and Gasching, 1981; Wong and Mylopoulos, 1977).

Using OPICS combined with an ES can help resolve some of the aforementioned problems. Accordingly, a summary of industry statistics is placed in a computerized data-base, which is accessible to users, buyers and sellers by telecommunication networks (Kleinrock, 1982). An integrated telecommunication network can be composed of multiple local area networks (LAN) connected to each other via hard-wired, radio, microwave, terrestrial, and satellite communication.

A diagnostics program interrogates the users about the status of their OPICS system. For each installation, the system accumulates user responses and saves them in a data base. Subsequently, this diagnostics program weighs the responses of the local users, and compares them to the industry standards (stored in the data base). Based on these comparisons, the diagnostics program can make specific technical and non-technical recommendations, which are based on industry statistical standards, but are also custom-tailored to a specific OPICS installation.

The design of such an evaluation system (ES) is one of the stated objectives of the present study. To accomplish this task, several steps are taken. First, the theories of consumer satisfaction are reviewed to identify and define the determinants of user satisfaction. These determinants along with the overall user satisfaction are quantified through a survey questionnaire. Then these determinant scores are regressed against the satisfaction scores to compute their respective weights and the industry averages in the model. Subsequently, the model is tested statistically to decide whether it is generalizable to the population of OPICS users. Finally, if it is generalizable, it then can be incorporated into an interactive on-line ES model.

Such an ES model compares industry standards (averages) to the averages of an individual OPICS installation. It accumulates the responses of all the users in an installation. It then identifies the OPICS system weaknesses, rank-orders, and proposes priorities and recommendations for improvements in an audit trail report. In addition, it also updates the data base, measures the adherence to previous recommendations and issues a progress report. This report indicates the gains or losses in overall OPICS user satisfaction compared to the entire industry.

The above literature review sheds some light on the importance of different criterion variables and their consideration in the ES for OPICS systems. System rating information could be a very useful tool to managers who are designing the acquisition of OPICS systems, as well as to vendors, who must decide which systems to develop, market, and/or support.

Measurement of system ratings is quite complex and requires a selection of various criterion (independent) variables. It also requires an analysis of these variables to determine how they are related to one another. This paper describes the results of a system rating study in which the users were asked to respond to many questions. These questions (independent variables), based on the literature, are the primary determinants of overall user satisfaction (dependent variable).

The overall user satisfaction is related to these OPICS variables with the use of multiple regression analysis. This analysis is the basis for the design of an ES for forecasting user satisfaction in a specific computer installation. ES can compare the current user satisfaction to industry standards, past levels of satisfaction and desirable future levels of user satisfaction.

SURVEY METHODOLOGY AND DATA COLLECTION

This survey was based on results received from questionnaires mailed to a very carefully controlled nth sampling from randomly drawn subsets of computer user lists. A total of 15,218 questionnaires were sent to computer users. The specific subsets were identified and qualified by a panel of experts. In an effort to improve the response rate, and thereby increase the statistical validity, the users were contacted twice; a first request was followed weeks later by a second request. The response rate was 32%, representing 4,597 users, who responded to 4,870 questionnaires (some users evaluated more than 1 computer model).

Judges invalidated 379 responses, including 178 users who rated two different computers at the same time; another 43 users rated more than 2 different systems simultaneously. Datapro (1984) batched the remaining 4,448 valid returns by vendor, model, users, and computer types [mainframes or plug compatible mainframe computers (maxis), minicomputers and small business computers (minis), and desktop personal and microcomputers (micros)] as follows:

	Maxis	Minis	Micros	Total
Users............	1,919	2,192	337	4,448
Computers........	67	93	18	178
Vendors..........	10	28	17	55

Each questionnaire allowed the user to rate one system. The recipient was encouraged to reproduce the form if he/she wished to rate more than one system. For each system the responses were averaged and recorded. Labels were used as initial validation vehicles and for identification and elimination of duplicate returns. Recipients were asked to summarize their experiences with the systems currently being used and to answer questions about them.

When returns were received, they were audited by an expert panel. Duplicate responses were invalidated. Also eliminated were all forms which failed on any of the following points: did not identify the manufacturer or model; did not withstand a "reasonableness" test; evaluated different systems on one form; were forgeries; lacked system ratings; rated non-computer systems; or revealed a vested interest on the system being rated.

METHODS AND PROCEDURES

A total of 178 computer systems were represented in the survey. The present authors coded and stored the responses to 23 questions (variables) on the computer (see variable legend). The data were tested for validity and consistency. For example, the percentage values were checked for the range between 0 to 100. Nonresponse bias was evaluated with an F-test and found to be insignificant.

The procedure of data collection and data based updates is done through an interactive on-line questionnaire (IOQ) which is a model of the ES. This method of data collection avoids the pitfalls of the traditional manual questionnaires. Some of these pitfalls include: (1) incomplete, illegible responses, (2) non-response and sampling bias, (3) low response rate, (4) long elapsed time from distribution to the analysis phase, (5) time consuming, error prone data transcription and key-punch operation, and (6) disruption, resentment and anxiety produced in the respondent and most importantly, (7) ambiguity in questionnaire items. This IOQ controls the above problems by validation procedures, and most importantly, it clarifies ambiguities, through help files. A respondent can enter a "?" instead of an answer, to obtain clarification concerning an ambiguous item.

Based on the multiple regression equation and the industry averages, an evaluation system was designed and developed. The language BASIC along with LOTUS 123 interfacing with Knowledge Manager was used for the microcomputer version, while the minicomputer and mainframe models were developed in BASIC alone.

RESULTS AND DISCUSSION

The predicted variable (overall satisfaction) is regressed over the criterion (independent) variables. This is done by a forward stepwise inclusion procedure, in a manner which provides considerable control over the inclusion of independent variables in the regression equation (Theil, 1971; Nie et al., 1975).

Table 1 presents the statistics used for the overall test for goodness of fit for the regression equation. This table shows the multiple R, R squared, the standard error and an analysis of variance (ANOVA) for the regression model. This step was selected because each additional variable added to the model increased the multiple R of the model while having an overall F value statistically significant at the .01 level.

---Table 1---

The relative importance of each of the predictor or independent variables on the predicted or dependent variable is described in Table 2. This relative importance is described by the BETA, the change in satisfaction, due to one standard deviation change in the predictor criterion variable value. These variables and their coefficients are the basis for the ES model, used in an interactive on-line questionnaire (Appendix A).

---Table 2---

Table 3 shows the significance test for specific coefficients of the model. The coefficients in Table 3 show the R square (RSQ) change due to each variable in the model. RSQ determines the inclusion sequence.

---Table 3---

EVALUATION SYSTEM FOR ORDER PROCESSING AND INVENTORY CONTROL

Traditionally, experts have been using survey-questionnaires to evaluate OPICS. Such a questionnaire would usually be administered manually through an interview. These manual software evaluation methods have numerous disadvantages.

In contrast, an on-line interactive data collection offers many advantages. Most importantly, selective clarifications are provided by help files and immediate feedback becomes plausible. In fact, a computerized evaluation system analyzes the data, immediately after it has been entered, providing immediate feedback and diagnostics to the user, as Figure A shows.

--- INSERT FIGURE A HERE ---

The OPICS ES interactively interrogates the user about the system (Figure A). User responses are underlined and recorded anonymously in a data-base. Subsequently, the ES generates the OPICS diagnostics audit trail (Figure B). This report trails after the interactive questionnaire, providing immediate feedback. Later, it may also be used by an internal or external auditor, manager, or user for system development. This audit trail is self-explanatory. It compares the user's installation to industry standards, based on the frequently updated data-base information.

--- INSERT FIGURE B HERE ---

This OPICS diagnostics audit trail sorts the report items in ascending order of the current deviates, which reflect the relative weaknesses (-) or strengths (+) of this installation relative to the industry. It generates a current overall user satisfaction score (68.017), compares it to the prior score (50.131), and computes the gain or loss in overall satisfaction.

This OPICS ES decomposes the change in overall satisfaction, and it identifies the sources of the change. Based upon that, it also generates prioritized recommendations for further improvements (Figure C). The responses of the user, along with the diagnostics audit trail are stored in a transaction file, and eventually merged with the old data-base master file to form the updated master file.

--- INSERT FIGURE C HERE ---

HOW USERS INTERACT WITH THE OPICS SYSTEM

Most OPICS users are people who are familiar with order-entry and inventory control, but not necessarily with computer systems. Therefore, a typical microcomputer user starts the interaction without any prior knowledge about it.

This evaluation OPICS software is typically linked to the main order-processing and inventory control system, which is a module in an integrated accounting package. The linking software is activated by a software switch, which is turned "on" subsequently to any modification made to main order-processing and inventory control systems.

--- INSERT FIGURE D HERE ---

Typically this cycle starts with some modification of the OPICS system (Step #1 in Figure D). For example, suppose that an additional inventory method was added to the system by the programmer. This new addition enables the system to compute the probability of stockouts and reorder quantities with lead-time and minimum safety stock (Step #2). As soon as the new revision has been saved on the final user diskette or hard disk, the linker program software switch is set to "on" (Step #3).

The end-user will run the new version of the OPICS system with the added information and will form some opinion about it. At the end of the execution, the system will notice that the linker switch is on. Then the system will execute the evaluation routines (Step #8), which will display the following message on the screen: "WELCOME TO THE INTERACTIVE ON-LINE SYSTEM FOR OPICS SOFTWARE DIAGNOSTICS."

The diagnostic evaluation system will then explain the objective of the questionnaire. It will instruct the user with a way to respond to the questionnaire and provide additional help upon request. Thus if the users type a "?", the system will display the first help screen. If the users are still confused and would like to obtain a second screen of helpful information, they are instructed to type "??" and additional information will be provided. This can be repeated four times. Each additional "?" provides additional information.

After having received additional help, the user will be prompted with questions 1 through 23, and will have to answer them to properly terminate the job.

The first eight questions deal with the background of the OPICS system and its users. Questions 9 through 23 solicit users' evaluation of the system as it is after the modification. Finally, the user is requested to make any additional comments concerning the system. The user can then display the results on the screen, print them on the printer, or both (Step #10).

The system saves the report on disk or diskette. If the system has only floppy diskettes or removable hard disks, then the user is requested to mail a copy of the diskette to a centralized computer center. The new information will update the central evaluation data base and this updated master file will be sent back to the user.

If the system is equipped with a hard disk and connected to a central computer center through a local area network or remote job entry communication, the system will automatically transfer information and update the master files in both the central location and the network peripherals (Step #11).

At the same time, the linker switch will be turned off. Thus, the diagnostic routine will not be executed until another change is implemented on this OPICS system (Step #9). Thus, if no changes are made the second time, the diagnostics routine will not be executed.

HOW CAN THE DIAGNOSTIC SYSTEM HELP CURRENT USERS?

Psychologically, the system helps users to feel that their grievances are considered by the system designers and policy makers. The diagnostic audit trail in Figure B compares the system attributes to industry standards, as well as to the attributes prior to the most recent modifications. Thus, the users as well as the system planners and programmers get feedback about their attempts to improve or upgrade the systems.

Typically, the objective will be to maximize the overall user satisfaction score, or at least increase the gain of user satisfaction compared to the pre-modification score. The example in Figure B shows that the current user's satisfaction for this system is 18.194 lower than the industry standard for this hardware (a score of 86.211). Moreover, a substantial improvement compared to the previous modification, which was 36.08 below industry standards. Accordingly, the system reports a 17.886 gain in user satisfaction.

HOW CAN THE SYSTEM HELP BUYERS?

This system can help buyers to select vendors for their systems. Buyers or potential users can obtain user-satisfaction scores on different computers, and compare them to one another and to a grand-average. Presumably, buyers will select vendors who have the highest user-satisfaction scores. Even if buyers will not make their decision based on the user satisfaction scores, these scores can serve as reassurance that other users like a particular system and add credibility to the buyers.

SUMMARY, CONCLUSIONS AND IMPLICATIONS

In summary, the multiple regression has been used to study the dependence of overall satisfaction of an OPICS system with many OPICS variables. The overall significance tests of the goodness of fit of the model have been conducted. The multiple correlation coefficient was 0.911, thus the null hypothesis that the correlation coefficient was zero was rejected. A sample run of the ES was illustrated together with an OPICS audit trail report and prioritized recommendations.

In conclusion, many independent variables had regression coefficients which were significantly different from zero. The variables were rank ordered according to their BETA values. Ease of operation was ranked the single most important factor for determining satisfaction. Other variables which contributed overwhelmingly were as follows: computer reliability, ease of programming, whether the installation was a mainframe, and effectiveness of the maintenance service. OPICS applications have a positive effect on satisfaction. There is a negative effect from using mainframes and minis. Application should be down loaded from mainframes into micros. This may indicate that more attention should be devoted to OPICS user satisfaction, especially for the mainframe computers.

It appears that the satisfaction depends on ease of operation and computer reliability, while whether a computer is leased from a third party, and the ease of converting vendor software had a minimal effect on overall satisfaction.

The implications of the present study are many. The overall satisfaction of system users can be measured by answering certain questions and these results can be very useful to system users as well as buyers and vendors. OPICS system buyers can compare different variables and thus can calculate the overall satisfaction they would derive by buying the system. The vendors and designers can build OPICS systems based on the criteria which are important to users. Thus, they will maximize user satisfaction and eventually increase their sales.

OPICS vendors of the computer systems can determine the variables which would increase the overall satisfaction of their products. Thus, they would be more likely to incorporate some of these features in their systems. This could lead to better OPICS systems as well as increase research and development. Vendors could also use these data as a marketing tool for their products. If their OPICS systems have the features, which were highly ranked, they could advertise them and attract additional customers. These kinds of studies could promote vendors who are concerned with user satisfaction, and provide them an advantage over the competition.

Most importantly, this ES for OPICS provides the buyer or user with an effective tool for system selection and upgrade. Buyers can evaluate potential OPICS systems based on their user satisfaction scores, and eventually choose a system that will yield the highest satisfaction compared to other systems. Current users can evaluate the satisfaction at their installation and compare it to market standards, identifying weaknesses and strengths. Moreover, they can apply remedial action to improve their satisfaction and gauge their progress by running the ES on a regular basis.

TABLE 1

MULTIPLE REGRESSION

Overall significance test for goodness of fit of the regression equation and analysis of variance (ANOVA)

		Analysis of variance	DF	Sum of squares	Mean Square
Multiple R..	.911				
R Square....	.830	Regression...	22	12854.826	558.905
Adjusted R square......	.805	Residual.....	155	2629.791	16.966
Standard error.......	4.119	Critical F...	1.88	Calculated F	32.942*

*Overall Significance at less than the .01 level

TABLE 2

VARIABLES IN THE EQUATION

Significance Test for Specific Coefficients in the Regression

Step No.*	Variable Name	B	BETA	Rank**	Std. error of B	F
1.	Operation	.293+0	.256	1	.069	18.060
2.	Trouble Shooting	.100+0	.116	7	.053	3.624
3.	Computer	.214+0	.194	2	.055	15.102
4.	Programming	.127+0	.130	3	.059	4.783
5.	Peripherals	.672-1	.064	13	.055	1.472
6.	Compilers	.742-1	.099	9	.038	3.744
7.	Expectations	.378-1	.065	12	.023	2.755
8.	Education	.314-1	.034	20	.056	.312
9.	Microcomputer	.723-1	.083	10	.037	3.735
10.	Operating System	.112+0	.117	6	.055	4.077
11.	Effectiveness	.123+0	.129	5	.064	3.723
12.	Mainframe	-.536-1	-.130	4	.023	5.676
13.	Minicomputer	-.395-1	-.109	8	.019	4.352
14.	Life in Mos.	-.737-1	-.049	17	.053	1.939
15.	Application	.299-1	.043	19	.027	1.213
16.	Documentation	.438-1	.050	16	.048	.828
17.	Lease	-.482-2	-.007	23	.049	.010
18.	Responsiveness	.226-1	.025	21	.058	.153
19.	No. of Systems	.145+1	.077	11	4.380	.109
20.	No. of Users	-.136+1	-.064	14	4.968	.075
21.	Acquisition	-.221-1	-.057	15	.048	.217
22.	Rental	-.189-1	-.049	18	.048	.158
23.	Conversion	.824-2	.011	22	.040	.043
	Constant	-.202+2				

*Ranked in descending order of contribution to the explained variance (R-square change - Table 3)

**Ranked according to BETA, which indicates change in satisfaction, due to one standard deviation change in the respective variable.

---VARIABLE LEGEND---

1. Ease of operation..................................(Operation)
2. Technical support trouble-shooting.................(Trouble-shoot)
3. Reliability of computer............................(Computer)
4. Ease of programming vendor software................(Programming)
5. Reliability of peripherals.........................(Peripherals)
6. Compilers and assemblers...........................(Compilers)
7. Systems meeting user expectations..................(Expectations)
8. Technical support-education........................(Education)
9. Microcomputer systems..............................(Microcomputer)
10. Operating system..................................(Op. System)
11. Effectiveness-maintenance service.................(Effectiveness)
12. Mainframe computer system.........................(Mainframe)
13. Minicomputer system...............................(Minicomputer)
14. Average system life in months.....................(Life in mos.)
15. Application programs..............................(Applications)
16. Technical support-documentation...................(Documentation)
17. Lease from third party............................(Lease)
18. Responsiveness of maintenance service.............(Responsiveness)
19. Number of systems represented.....................(No. of systems)
20. Number of user responses..........................(No. of users)
21. Purchase acquisition method.......................(Acquisition)
22. Rental or lease from manufacturer.................(Rental)
23. Ease of converting vendor software................(Conversion)

TABLE 3

SUMMARY TABLE

Variable	Multiple R	R Square	RSQ* Change	Simpl. R	B	BETA
Operation	.722	.521	.521	.722	.293+0	.256
Trouble-Shoot	.828	.686	.165	.628	.100+0	.116
Computer	.868	.754	.067	.677	.214+0	.194
Programming	.882	.777	.023	.690	.127+0	.130
Peripherals	.886	.786	.009	.569	.672-1	.064
Compilers	.890	.793	.007	.495	.742-1	.099
Expectations	.893	.798	.005	.361	.378-1	.065
Education	.896	.804	.006	.529	.314-1	.034
Microcomputer	.899	.808	.005	.002	.723-1	.083
Op. System	.902	.813	.005	.666	.112+0	.117
Effectiveness	.904	.817	.004	.561	.123+0	.129
Mainframe	.906	.820	.003	-.062	-.536-1	-.130
Minicomputer	.908	.825	.005	.062	-.395-1	-.109
Life in Mos.	.909	.827	.002	-.164	-.737-1	-.049
Applications	.910	.828	.001	.423	.299-1	.043
Documentation	.911	.829	.001	.530	.438-1	.050
Lease	.911	.830	.000	.067	-.482-2	-.007
Responsiveness	.911	.830	.000	.494	.226-1	.025
No. of systems	.911	.830	.000	.103	.145+1	.077
No. of users	.911	.830	.000	.100	-.136+1	-.064
Acquisition	.911	.830	.000	.059	-.221-1	-.057
Rental	.911	.830	.000	-.100	-.189-1	-.049
Conversion	.911	.830	.000	.597	.824-2	.011

* Primary key for forward step-wise inclusion of criteria variables

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