
Enhancing System Analysis and Design Through Value Training

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ABSTRACT

The development and implementation of computer-based information systems requires a significant amount of interaction between analysts and clients whose values and goals may differ. These interpersonal differences will influence the effectiveness and quality of the resulting system. The purpose of this study was to determine whether training in personal values using an automated expert system would affect the behavior of analysts, their attitudes toward clients, and the quality of new information systems. Results indicate that subjects liked the training and believed it to be beneficial. In addition, interpersonal behavior among members of design teams improved and the resulting systems were superior to those done by teams who had not received the training.

INTRODUCTION

Successful analysis, design, development, and implementation of computer-based information systems requires a cooperative interaction of both technical and nontechnical groups. Systems analysts involved in these projects must serve as coordinators among the members of these diverse groups and orchestrate team efforts to insure a well-designed, workable system. The analyst(s) must frequently interact with computer operators, programmers, users, managers, other systems analysts, and vendor representatives. Current literature also suggests that "Executive Steering Committees," "Project Task Forces," "User Groups," "Project Planning Groups," "User Involvement," "Top Management Support," etc., are necessary to increase the probability of success of a systems project [9]. These concepts are generally accepted and stressed in most Systems Analysis and Design classes. However, little if any effort is made to prepare students to recognize and deal with different motivating factors that influence behavior and decisions of others in a business setting.

The breakdown in communications between programmer/analysts (technical) and users (nontechnical) has been a frequent problem in the design of computer-based information systems. This problem, usually resulting in user dissatisfaction and/or user nonacceptance of systems, has plagued designers and developers since the earliest application. Over the years, approaches for dealing with this persistent problem have evolved to include: combating user resistance, soliciting management support, user involvement in design processes, managing user expectations, user designed systems, and prototype designs. While these approaches have enjoyed limited success in improving acceptance of new computer-based systems, the key ingredient — regardless of the design approach — is an

analyst who not only can communicate well, but is one possessing well-developed interpersonal skills, able to relate to user views and concerns [7, 10].

The subject of interpersonal skills is not absent from analysis and design texts, in fact Whitten, Bentley and Ho [10, pp.18-19] suggest "...to properly prepare for a career as a successful systems analyst, you should develop or refine your ability to work well with many types of people." Also on this subject, Powers [7, pp.201-202] points out that "The successful systems analyst combines a strong technical background with well-developed interpersonal skills, and has the imagination and flexibility to develop creative solutions." As the numbers of end-users and on-line users increases, the "responsiveness of effective systems development methods to meet user needs are matters of growing concern for information systems managers" [3]. Regardless of the obvious importance of these skills, very little insight is offered to the reader on ways of enhancing or developing needed expertise.

The Importance of Personal Values

An understanding of personal values is very beneficial in any group situation where people interact to perform tasks, to make decisions, or to solve problems [2]. Simply understanding one's own values will lead an individual to better decision making, more effective actions, and greater success in dealing with others [1]. Recognizing and understanding the values of others, will enable individuals to communicate, manage, and negotiate more effectively [4].

Values are learned beliefs. Individuals learn them from family, religion, peers, educators, and experiences. Values direct how a person acts and what he/she thinks. If an idea is not consistent with a person's values, the person is not likely

to recognize or even consider it an option. It is not suggested that any value set is superior to another, but rather, that individuals simply have a learned set of values that may differ from those of others with whom they interact.

Two crucial tasks are involved in learning about personal values. First, analysts must be made aware of their own values, how these values may influence their perceptions, and how to recognize and relate to others with different value sets [7]. Second, they must learn how these values are likely to affect the decisions and actions of other individuals, or groups within an organization, and how these values can be managed [5].

THE PERSONAL VALUE ANALYSIS (PVA) SYSTEM

A microcomputer based software package called the PVA was developed by the authors to supplement the text and classroom lectures dealing with communication skills, group dynamics, and interpersonal skills. This package is an "expert system" designed to aid students in learning more about their own values, and the impact of personal values on the behavior of other individuals and groups within organizations. The reliability and validity of individual values which are measured by the system, along with the interpretation and significance of these values have been reported in previous papers [4, 8].

The PVA measures five basic values that influence an individual's thinking, decision making, and actions. These values include: (1) political, characterized by the pursuit of power; (2) aesthetic, those who seek beauty, symmetry, and harmony; (3) social, indicating love of fellow beings; (4) theoretical, those who value truth and knowledge above all else; and (5) economic, those who value practicality and usefulness [4].

The initial screen of the PVA provides the student with a brief introduction to the system and its purpose. The learner is then instructed to complete a 20-item questionnaire designed to measure his/her values. Scores are calculated for each of the five values, the values are ranked in order of importance based on the scores, and this information is presented to the student with a hard copy option.

Following this the student is provided with a more detailed explanation of the five values being measured and how these values may influence decision making and behavior. The system then provides the learner with a personalized set of screens based on the ranking of his/her own values (see Figures 1 and 2).

Following this presentation, the student is provided with a list of 20 different occupational groups whose value norms are stored within the system. Those occupational groups whose value profile has a high correlation to that of the student's are highlighted. The student then selects a specific occupational group that he/she would like to have their values compared with. The system will display a profile of the group's values and the student's values in the form of a linegraph. This

Figure 1 — Sample Display for High Theoretical Value

INDIVIDUAL ANALYSIS

Because your THEORETICAL score was highest, this indicates that:

You tend to value knowledge, information, and theory. You may have little regard for emotional or aesthetic appeals that are not based on fact or research.

These tendencies are valuable to you and your organization in problem solving and decision making when thought, logic, criticism, and empiricism are needed. However, they may keep you from fully appreciating the need for emotional and aesthetic appeal in selling ideas to other people both within and outside the organization.

Beware the tendency to wait for more and more information before acting. Recognize that others may need to act before all the information is in, or may need to add emotional or aesthetic appeal to your work.

PRESS ENTER FOR ADDITIONAL ANALYSIS. ?

Figure 2 — Sample Display for Low Economic Value

INDIVIDUAL ANALYSIS

Because your ECONOMIC score was lowest, this indicates that:

You tend not to value practical action and efficiency as much as some other people might. This tendency may be compensated for by insuring that you have team members who value action and efficiency. Remember that it may be better to do anything than to do nothing. Set goals and deadlines and work toward accomplishing them.

If you would like to compare your rankings to those with similar demographic characteristics or if you are participating in a group analysis, type Y and press enter. If not type N, and press enter.

comparison may be repeated with as many different groups as the user wishes.

Upon completing this phase (individual analysis) of the PVA the learner will have gained considerable insights into his/her own values, and how these values may influence his/her perception of a particular problem. At this point, students not participating in a group analysis may exit the system with a new understanding of themselves. If they are participating in a group analysis (maximum ten members) the system will save each member's value scores in a file based on the group's ID number. After all group members complete the individual analysis, each proceeds to the "Group Analysis" phase of PVA.

The group analysis portion of PVA provides the student with a summary of the value norms for their particular group, along with descriptions of what the norms indicate. Following this, members are provided with a series of bar charts illustrating the importance of their values compared with those of other group members, and an interpretation of the differences between these values (see Figures 3 and 4).

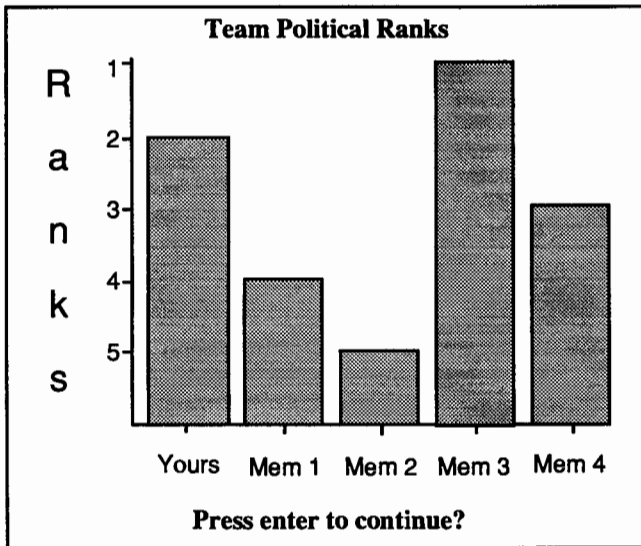


Figure 3 - Group Political Comparison

If your SOCIAL score is higher than other members of the group, you may experience the following:

You may feel that the group is not concerned enough with the welfare of the people affected by the decision. Other members may discount your appeals for humanitarian concern for people affected by the results.

If your SOCIAL score is lower than other members of the group, you may experience the following:

You may feel that the group is too concerned with the feelings of outsiders. Other members may view you as insensitive to the welfare of people affected by the results.

IF YOU WOULD LIKE TO GO BACK AND LOOK AT THE GRAPH AGAIN TYPE Y AND PRESS ENTER; OTHERWISE TYPE N.

Figure 4 - Explanation of Social Values

The Method

In order to study the effects of value training on student performance, those participating in systems analysis and design team projects were required to complete the program of value training using the PVA system. To motivate the students to learn about values affecting interpersonal relationships, a test on the subject was scheduled the following week!

They were assigned use of the PVA in systems classes approximately two weeks after the design teams were formed and the systems projects were well under way. This delay before introducing the PVA gave individual team members ample opportunity to experience interpersonal conflicts and disagreements with others on the design team.

EVALUATION OF RESULTS

After studying the PVA System an obvious transformation in individual student attitudes and team spirit occurred. Students

were much more tolerant of other team members, those members who may not have been doing their fair share of the work took more interest in the project, and those members who had occasionally disagreed seemed more cooperative. The average grade for projects in this class was eight percentage points higher than the average project grades on two prior systems classes.

Two hundred, twenty-one students participating in team projects rated the PVA on the following nine statements using a five-point Likert Scale from 1 (strongly disagree) to 5 (strongly agree). Four of the questions were completed following individual analysis (see Figure 5). Questions 5 through 9 were completed after group analysis. The mean rating for each statement is listed. Note that questions 5 and 6 following group analysis, are identical to questions 3 and 4 following individual analysis. The significant increase in ratings indicates students feel that they know more about values after group analysis than they know after individual analysis, even though ratings are high following individual analysis.

<p>AFTER INDIVIDUAL ANALYSIS</p> <ol style="list-style-type: none"> 1. My Personal Value Analysis is accurate. (3.92) 2. My Personal Value Analysis is useful. (3.90) 3. I learned a lot about personal values. (3.65) 4. I learned a lot about how values affect decisions and behavior.. (3.74) <p>AFTER GROUP ANALYSIS</p> <ol style="list-style-type: none"> 5. I learned a lot about personal values. (3.96)* 6. I learned a lot about how values affect decisions and behavior. (3.84) 7. My group's value analysis is accurate. (3.55) 8. My group's value analysis is useful. (3.79) 9. Our group will be more successful because of what we have learned about our values. (3.78) <p>* Mean differences between questions 3 and 5 is significant at $p < .001$</p>
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Item 9 is the most important statement. Seventy percent of the students either agreed (4) or strongly agreed (5) that their teams would be more successful due to learning about their values.

CONCLUSION

Value training has been used successfully in several systems design classes and other project-oriented courses. The PVA System provides the students with an opportunity to privately evaluate their own values, receive a description of these values and their significance, and then compare their values to those of other members of the group. After completing, the PVA students were more aware of individual differences and the importance of group dynamics. Students are also better able to function as members of a team. Evaluations were administered to several classes to determine the accuracy and usefulness of the system. Student responses to these evaluations were very positive. Based on its success with student

analysts, the PVA system may prove to be a useful tool for systems analysts and design teams in work settings.

The findings of this preliminary investigative study indicate that value training could be used by individuals and groups involved in systems projects to reduce interpersonal conflicts and breakdowns in communications. Individuals who understand the impact of their own values and the values of others listen and communicate better. Additionally, allowing and understanding the influence of their own values allows people — both analysts and clients — to recognize and deal with personal limitations. For instance, people with high “power” or “economic” values may realize through training the need to be more patient with high “theoreticals” who need time for studying the problem and time to be precise, or with “aesthetics” who may be more concerned with the appearance of user interfaces, and with “socials” whose concern might be with the system’s impact on people. Conversely, value training will help the theoreticals, the socials, and the aesthetics to recognize the importance of efficiency in staying within time and budget constraints.

The formation of project teams made up of members with diverse value sets will insure that attention is given to all aspects of good design. The resulting systems will be based upon a solid theoretical foundation, well documented, well designed, efficient, and user oriented.

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